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UNIVERSITY DEVELOPMENT LINKAGES PROJECT

among

**Case Western Reserve University
The University of Michigan
The University of Oklahoma
and
Chulalongkorn University, Bangkok, Thailand**

**UNITED STATES
AGENCY FOR INTERNATIONAL DEVELOPMENT**

**Cooperative Agreement
No PCE 5063-A-00-3010-00**

FINAL REPORT

prepared by

**John F Scamehorn, Ph D , P E
Asahi Glass Chair in Chemical Engineering**

**School of Chemical Engineering and Materials Science
The University of Oklahoma
Norman, Oklahoma 73019**

28 June 1998

INTRODUCTION

University Development Linkages Project (UDLP), Cooperative Agreement No PCE 5063-A-00-3010-00, was awarded 21 April 1993 for a period of five years. However, due to early closure of the USAID mission in Thailand, UDLP funding was only provided for the first three years of the five year project.

The linkage project has two objectives:

1. Establishment of a sustainable collaborative venture involving an academic partnership among Chulalongkorn University, Bangkok, Thailand, and three U.S. universities: Case Western Reserve University, the University of Michigan, and the University of Oklahoma.

2. Establishment of innovative graduate programs in petrochemical technology and polymer science in the Petroleum and Petrochemical College (hereafter called College), Chulalongkorn University, using the combined resources of the academic partnership.

SUMMARY

This collaborative venture can be summarized as a tremendous success with the UDLP funding providing a crucial element in this accomplishment. Not only are the educational aspects of the Petroleum and Petrochemical Technology College firmly in place, but funding from a variety of sources has made the program very sustainable, even with recent economic problems in Thailand.

Accomplishments are highlighted in brief in the following paragraphs. Details of the program are systematically detailed in two attachments: (1) Activity Report 1995 - 1997 and (2) minutes and handouts from the 1997 annual steering committee meeting.

REPORT OF ACTIVITIES

THE COLLABORATIVE VENTURE

A new five year collaborative agreement between Chulalongkorn University, the University of Oklahoma, the University of Michigan, and Case Western Reserve University was signed by the university's presidents to continue the collaboration from January, 1998 through December, 2002.

Until 1998, most of the graduate students in the college spent time at the U.S. university with their American coadvisor. By the end of 1997, 99 Thai students had visited U.S. universities. Four U.S. graduate students from U.S. partners have spent from one month to one year at the College in exchange visits. Financial constraints (including a ban on travel with government funds during the financial crisis) have caused a (hopefully) temporary interruption in student travel. U.S. faculty

continue to work with their student advisees when they are teaching at the college and the college have provided funding for travel of U S faculty to Bangkok in special cases, such as new faculty who have not taught in the college before to present research topics Also, the college now funds a U S professor to come to Bangkok in January each year to help interview students for the next year class, an activity which was funded by UDLP during the first three years of the college As the students have more senior experienced students to receive advise from and as the vast majority of U S faculty are repeaters and the Thai faculty have almost all visited the U S partner universities, the reduced travel is natural and lack of travel funds have not seriously inhibited interactions

Each year, in July, there is a steering committee meeting with representatives from each partner university to discuss activities (the minutes and handouts from the 1997 meeting are included as an attachment) This meeting gives all partners a chance to discuss any problems and evaluate progress Communication among partners is excellent Detailed management is now done from the administration of the College at Chulalongkorn University including many of the duties formerly done by the U S coordinator Each of the three U S universities has one or two designated coordinators (Harwell and Scamehorn for OU, Schwank and Gulari for UM, and Ishida for CWRU) In addition to this steering committee, there is a Governing Board and an Executive Board in place which meet periodically The management of the program and methods of communication seem well established Little change is anticipated in the near future

The College continues to recruit new faculty which is strengthening the program Payment to U S instructors now includes supplements for supervising theses and for publishing papers Short courses by visiting U S faculty to Thai industry through the College and seminars by visiting speakers bring visibility to the College as well as income

GRADUATE PROGRAMS

a Instructional Schedule

The collaboration between the four partner universities is firmly established with 17 courses offered in the Petrochemical technology and the Polymer Science Programs together in academic year 1997 Of these, approximately half were taught by faculty from U S partner universities The other half were taught by Chulalongkorn University and other visiting faculty (other U S universities or Thai industry) There is a trend to U S faculty and College faculty sharing courses (e g , the U S faculty teaches the first half and the Thai faculty the second half of a course) This appears in many cases to be more efficient than each teaching separate courses

b Publications and Presentations from College

Publications (papers, books, and book chapters) and presentations at major technical meetings from College theses are becoming prolific with 12 refereed publications published or accepted as of July, 1997 and many more presentations at international technical meeting Details are provided in the attachment from last year's steering committee meeting These publications and presentations indicate

that the College is attaining its objective of performing world-class research

c Graduated Students and PhD program

Including the graduates from the college for 1998, a total of 159 students have graduated with M S degrees, approximately half from Petrochemical Technology and half from Polymer Science. Until this graduating class (July, 1998), employment opportunities have been excellent for the graduates of the College. In 1997, the first PhD students were admitted into the program, representing an expansion of the program beyond the initial scope of an M S degree program. The research infrastructure is anticipated to be improved due to the longer tenure of PhD students who provide continuity in operation of equipment, etc.

SUSTAINABILITY

As the USAID funding is nearly expended, the sustainability of the program beyond this point is a key feature justifying the start-up funds from UDLP.

The program is on solid financial and organizational footing for the foreseeable future. Funding for the program comes from Thailand industry (fellowships and other grants), the Thai government (through funded projects from its agencies and earmarked funding for items like equipment and general support like building maintenance and faculty salaries through the university), and tuition. As of July, 1997, grants and contracts to the college totalled 18,465,000 Baht (about \$500,000) and student fellowships have totalled 95 amounting to 40,000,000 Baht (about \$1,000,000). Starting with the entering class in 1998, a larger number of students were accepted with a fraction anticipated to do non-thesis M S degrees (more courses and a project). This will provide increased revenue due to increased tuition since the non-thesis M S students will not receive fellowships and will pay full tuition. This is anticipated to offset the decreased revenue because of the financial crisis which Thailand is facing (but not necessarily the Petrochemical industry in Thailand). Despite temporary "belt-tightening" due to decreased government funding because of this problem, long term financial sustainability is fine.

Interaction between the U S partner universities and Chulalongkorn university are excellent and faculty with an interest in long-term connections who return to Bangkok to teach courses every year or in alternating years have been identified. Currently, five M S graduates from the College are working on PhD degrees at partner universities in the U S. At least two of these will return to the College in Bangkok as faculty, further consolidating the long-term interaction among the partners. The fact that these students are doing well in their studies indicates the quality of training being given at Chulalongkorn.

In summary, the Petrochemical and Petroleum College at Chulalongkorn University program to generate M S graduates in petrochemical technology and polymer science in cooperation with the three American partners (University of Michigan, Case Western Reserve University, and University

of Oklahoma) is a great success and there is strong evidence of long-term sustainability

MINUTES
ANNUAL STEERING COMMITTEE MEETING
PETROLEUM AND PETROCHEMICAL COLLEGE
CHULALONGKORN UNIVERSITY

JUNE 17, 1997

ATTENDEES

University of Oklahoma

John Scamehorn
Jeffrey Harwell

University of Michigan

Erdogan Gulari

Case Western Reserve University

Hatsuo Ishida

Chulalongkorn University

Somchai Osuwan
Kamchad Mongkolkul
Sumaeth Chavadej
Kunchana Bunyakiat
Nantaya Yanumet

Report by Director

Dr Somchai passed out detailed information about the past year's progress in the college. Some highlights include

- 1 Each class now has between 25 and 30 students. The increased number partially reflects the need for more students for the PhD program. Of 19

graduates from last year's Petrochemical class, 17 have jobs even in the current poor economy. The Polymer students continue to have a harder time finding jobs. There are four students in the PhD program now. The college has changed the grading policy this year so that the grading scale shall be A, B+, B, C+, C, D. If a student receives less than a B, they will be allowed to retake a course, but the new grade will not replace the old grade and the retake is only permitted if the student's GPA is less than a 3.0.

2. The number of short or industrial training courses is down because of the poor economy.
3. Publications from college theses are now appearing at a high rate, with 12 now published or accepted for publication. In addition, there are numerous papers submitted and being prepared, as well as presentations at national or international meetings. It is desirable for Thai faculty to present more of these papers to increase visibility of the college.
4. The grant from the Science and Technology Higher Education Development Project has been tentatively approved for 444 million Baht over five years of which 35 to 40 % is anticipated to go to the college. Hopefully the start date will be January, 1998. Not counting this grant, total research and fellowship funding is anticipated to be 9,940,400 Baht this year, almost triple that of last year. The Thailand Research Fund and the National Science and Technology Development Agency are anticipated to be a major sources of funding of the PhD program.
5. Full time faculty continue to increase with the Petrochemical Technology faculty up to 10 either on staff or studying abroad and committed to return to the college upon graduation. The Polymer Science program has 9 such faculty. In addition there are four associate faculty. Recruitment of additional new faculty continues. Faculty salaries have been increased by increasing the base pay plus having a variety of incentives to increase the stipend (e.g., coadvising, coconstructing).
6. The base pay for US instructors to teach a month long course (3 credit hours) will remain for now at \$16,000, but incentives have been added. Payment of \$500 per thesis completed under the faculty advisement and \$500 per paper on which the US faculty is a author (split among any US coauthors) will be made annually. For 1996, the highest supplement was \$4,000.

USAID Grant

Only CWRU has to invoice OU to completely spend all the USAID money and Dr. Ishida said that they had now been done. Now, a final report is

required Scamehorn will spearhead this effort and may require information from all partners. When he returns to the US in July, he will determine what needs to go into the report and request information as needed.

Teaching

In the Petrochemical Technology program, it was decided that Thermodynamics, Transport Phenomena, and Kinetics will be taught annually since these courses are necessary to any students going abroad for a PhD and because these are required courses in essentially all American Chemical Engineering MS programs. In addition, Catalysis and Colloid Science will be annual electives since they are critical to research topics in the college. Also, Advanced Chemical Engineering Calculations will be taught annually since it is felt to be necessary as preparation for Kinetics and Transport. However, this does not need to be the first course taught each year as it has been as long as it precedes Transport and Kinetics.

In the Polymer Science program, five core courses were felt to be desirable by Dr. Ishida each year: Synthesis, Physical Chemistry, Physics, Characterization, and Mechanical Properties. The Thai faculty desire Processing each year. In the Polymer Science program, several courses will be co-taught in 1998 as a way to incorporate the Thai faculty in the teaching without necessarily having them teach a separate course. This is more difficult in the next few years in the Petrochemical Technology program because of the large number of faculty currently studying abroad.

The specific teaching schedules for 97/98 and 98/99 are attached. The Polymer Science schedule for 98/99 is not entirely defined with such factors as a desire to have Hudson teach Polymer Physics not incorporated. The 98/99 schedule has been moved from the normal routine to be able to have the steering committee meeting during the week of graduation along with a ceremony honoring the five year anniversary of the first courses taught at the college during the week of July 6-10. The only new US instructor is Daniel Resasco, a well-known catalysis expert from OU to teach the Catalysis course.

Research

There is a concern that the English skills of the students in writing the first draft of their theses needs improvement. The US instructors are spending

a great deal of time in correcting elementary English instead of spending this time more productively analyzing data, interpreting results, etc. Dr. Somchai has been trying to hire someone to help the students with their writing skills and drafts of their thesis, but has not filled the funded position yet. In case of a shortage of permanent staff to work on this, it was suggested that the college could fund US graduate students from the US partners to spend several months at Chula working with the students on both research and writing. This would also benefit the US student. Another helpful point would be to have the students write part of their thesis (e.g., Introduction and Experimental sections) several months before they have all their data and can write the Results and Discussion section. This would spread out the work of the US advisor so he or she is not suddenly buried by four or five theses at the same time in February.

If a patentable idea is present in a thesis, presentations of results to personnel outside the college prevents the patent from being issued in some countries. In such cases, the student will give their poster presentation as an internal presentation to college personnel only if the US or Thai advisors so desire to maintain patentability. The thesis will also not be made available to public examination until the patent is filed.

There was a problem this year with a US coadvisor being asked to approve theses which he found unacceptable and for which work he had not been consulted during the research. After substantial discussion, it was concluded that this is not a widespread problem and the individual US and Thai faculty involved did not have good communication. No policy change is necessary, but the assignment of coadvisors needs to be carefully examined.

One US instructor gave the College Director a list of names of students which he wanted as advisees after teaching his course. To avoid competition among US faculty for the top students, this is not considered appropriate and should not again occur. It is also not desirable that the US instructor list the Thai coadvisor when presenting research topics to the students. The college administration can be made aware of who the US faculty would like as coadvisor, but with many factors to be taken into account, they need the freedom to select Thai coadvisors. US instructors should generally also have some open topics (coadvisor not specified) available for other Thai coadvisors who may wish to work in their areas of choice. This will be beneficial particularly to new faculty. It will also help to broaden the college's scope for research grant applications.

The US partners continue to order chemicals, equipment, etc when it is unable to be obtained in Thailand. In order to ensure that this is the case and that the expenditure is approved, the US universities will not be requested to order things for the college unless the coadvisor approves the request.

The list of publications from college work will now be kept up to date by Dr. Sumaeth. It is desired that the US partners be told well ahead of time when an updated list from each of them is needed since it can take at least several weeks to query the faculty with travel etc. and provide this list. An opportunity to examine the list for errors by all the parties involved would ensure accuracy. For example, the current list is not entirely accurate. Since stipend supplements are determined from this list, it is important that it be correct.

Administrative, Scheduling, and Miscellaneous

It has been pointed out by Dr. Kamchad that the Memorandum of Understanding between the four partners is due to expire in December of 1997, but is renewable. The four partners all agreed at the steering committee meeting to continue the collaboration and renew the MOU and extend the collaboration to cover the PhD program as well. The draft of the MOU renewal will be drawn up by the college and circulated to all partners for modification and approval. The final MOU will then be sent to each partner in turn for signatures before the original MOU expires. The ceremonial signing will be held in July next year at the special function to celebrate the fifth anniversary of the collaboration.

The steering committee meeting next year is set for July 7, 1998 at the college. Graduation ceremony is on July 9. In this week, we plan to celebrate the five year anniversary of the first courses taught at the college. It will be five and one half years since the signing of the Memorandum of Understanding between the four partners and a ceremonial re-signing for another five years is anticipated during this week. Jamieson, Harwell, and Scamehorn will be either finishing up a course or just starting one, so they will be here already. We hope that the highest possible official from each university can attend the ceremony. Each US university representative (Harwell, Gulari, Ishida) shall inquire about this ASAP to maximize our chances of high level representation. Dr. Somchai has offered business class airfare and expenses for such a high level visitor to attend.

UM will chair the steering committee meeting next year, CWRU in 1999, OU in 2000, and the cycle will continue with Bangkok as the anticipated meeting place each year

Dr Somchai will fund travel (economy class) for two trips to the college from each US partner next year. There is potential for subcontracts to each US partner to cover such expenses as FAXing, secretarial help in accommodating Thai visitors, ordering and shipping items to Chula, etc. If the large grant starts next year, money for this will be more likely to be available

With the end of the USAID grant, the college feels that there is no longer a need for a overall US coordinator and all such activities will be handled from Chula. Scamehorn will share the OU coordination with Harwell, Gulari and Schwank will coordinate UM, and Ishida will coordinate CWRU

Particularly with this change in structure, there does need to be an improvement in communication between Chula and the US universities regarding setting dates for visits and other interactions. There have been several examples of Chula setting dates for visitors (students, faculty, or staff) to come to the US this past year without checking on availability of the US faculty involved. Also, in setting the teaching schedule, often numerous iterations are necessary when time conflicts come up and rescheduling needs to occur. Certainly the US partners want to fully cooperate in setting schedules, but need to be asked about timing

Summary

There is a general feeling of pride in having achieved a tremendous amount in the past four years since teaching started in the college and a feeling of optimism about the future

Submitted by John F Scamehorn, June 25, 1997



The Petroleum and Petrochemical College
Chulalongkorn University

Course Schedule
Academic Year 1997

Course	Date	Petrochem Courses	Polymer Courses
Intensive Course	April 17 - May 13	Perspective in Petrochemical Studies*	
Course 1	May 19 - June 13	Advanced Chemical Engineering Calculations (857602) <i>James O Wilkes, OU and Pornpote, CU</i>	Advanced Polymers and Composite Materials (858621) <i>Hatsuo Ishida, CWRU</i>
		Process Quality Monitoring and Improvement (857622) <i>Tep Sastri, TEXAS A&M</i>	
Course 2	June 23 - July 18	Colloid and Surface Science (857619) <i>John Scamehorn, OU</i>	Physical Chemistry of Polymers (858602) <i>Alex Jamieson, CWRU</i>
		Design and Management of Engineering Systems (857624) <i>Vira Chankong, CWRU</i>	
Course 3	July 28 - August 22	Transport Phenomena (857601) <i>Ed O'Rear, OU</i>	Polymer Characterization (858611) <i>Erdogan Gulari, UM</i>
Course 4	September 1-26	Catalysis (857614) <i>Johannes Schwank, UM</i>	Mechanical Properties of Solid Polymers (858708) <i>Anuvat, PPC</i>
Course 5	October 6-31 <i>(Petrochem)</i>	Chemical Reaction Engineering (857603) <i>Rick Mallinson, OU</i>	Science and Technology of Elastomers** (858620) <i>John Ellis PPC</i>
	October 6-24 <i>(Polymer)</i>		
Course 6	November 17-December 12 <i>(Petrochem)</i>	Natural Gas and Olefins Processing (857615) <i>Amit Chakma, REGINA and Pramote, NPC</i>	Science and Technology of Fibers** (858619) <i>Nantaya, PPC</i>
	November 3-21 <i>(Polymer)</i>		
Course 7	December 15-30 <i>(Petrochem)</i>	Petrochemical Industry Technology and Economics** (857625) <i>Harold Wittcoff, CHEM SYSTEMS</i>	Polymer Processing (858604) <i>Ica Manas-Zloczower, CWRU</i>
	December 1-26 <i>(Polymer)</i>		
Course 8	January 12-30, 1998 <i>(Petrochem)</i> January 5-30, 1998 <i>(Polymer)</i>	Energy Conservation in Industrial Processes** (857626) <i>Frank Steward, UNB</i>	Thermosetting Polymers and Polymer Adhesives (858622) <i>Brian Grady, OU</i>

* 1-credit course

** 2-credits courses



The Petroleum and Petrochemical College
Chulalongkorn University

Teaching Schedule
Academic Year 1998
(April 1998 to February 1999)

Course	Date	Petrochem Tech Courses	Polymer Science Courses
Intensive Course	April 16 - May 8	857501 Perspective in Petrochemical Studies*	
Course 1	May 11 - June 5	857614 Catalysis <i>Daniel E Resasco, OU</i>	858621 Advanced Polymers and Composite Materials <i>Hatsuo Ishida, CWRU and Suwabun C, PPC</i>
Course 2	June 8 - July 3	857602 Advanced Chemical Engineering Calculations <i>Jeffrey Harwell, OU</i>	858602 Physical Chemistry of Polymers <i>Alexander M Jamieson CWRU</i>
July 6 - 10		Steering Committee Meeting on July 7 th followed by Graduation Ceremony	
Course 3	July 13 - August 7	857619 Colloid and Surface Science <i>John F Scamehorn, OU</i>	858604 Polymer Processing <i>David C Martin UM and Kanchana T, PPC</i>
Course 4	August 17- September 11	857604 Chemical Reaction Engineering <i>H Scott Fogler, UM</i>	858708 Mechanical Properties of Solid Polymers <i>Anuvat S, PPC</i>
Course 5	September 21- October 16	857603 Advanced Chemical Engineering Thermodynamics <i>James O Wilkes, UM</i>	
Course 6	October 26- November 20		
Course 7	December 14, 1998 - January 8, 1999	857601 Transport Phenomena <i>Erdogan Gulari UM</i>	Inorganic Polymers <i>Richard Laine UM Sujitra, PPC</i>

* 1-credit course



LIST OF DELEGATES

1997 ANNUAL STEERING COMMITTEE MEETING

at the Petroleum and Petrochemical College

Chulalongkorn University

Tuesday 17 June 1997

8:30 - 17:00 Hr.

Case Western Reserve University

- 1 Dr Hatsuo Ishida, Professor
Department of Macromolecular Science

The University of Michigan

- 1 Dr Erdogan Guları, Professor
Department of Chemical Engineering

The University of Oklahoma

- 1 Dr Jeffrey H Harwell, Professor and Director
School of Chemical Engineering and Materials Science
- 2 Dr John F Scamehorn, Asahi Glass Professor
School of Chemical Engineering and Materials Science
Project Co-ordinator

Chulalongkorn University

- 1 Dr Kamchad Mongkolkul, Advisor
- 2 Dr Somchai Osuwan, Director, the Petroleum and Petrochemical College
- 3 Dr Sumaeth Chavadej, Deputy Director for Research Affairs
- 4 Dr Nantaya Yanumet, Deputy Director for Academic Affairs
- 5 Assoc Prof Kunchana Bunyakiat, Project Secretary

AGENDA

Annual Steering Committee Meeting

Petroleum and Petrochemical College, Chulalongkorn University

June 17, 1997 (8.30 AM to 5 00 PM)

1 INTRODUCTIONS (15 minutes)

2 REPORT BY DIRECTOR (1 hour)

Report by Dr Osuwan on activity in college over past year

3 USAID FUNDING (15 minutes)

Finishing up the USAID grant Discussion led by Dr Scamehorn

4 LONG TERM FUNDING PLANS (1 hour, 45 minutes) 10-00

Proposal to the "Science and Technology Higher Education Development Project" Funding from other Thai government sources Report by Dr Osuwan

Funding from Thai industrial sources Report by Dr Osuwan

Funding from private foundations and other sources Report by Dr Osuwan

5 FACULTY DEVELOPMENT (15 minutes)

Hiring and retention of permanent Thai faculty Report by Dr Osuwan

LUNCH (90 minutes) 12-00

6 TEACHING (45 minutes) 1-30

Teaching schedule for 97-98 and 98-99 Report by Dr Scamehorn

Future development of teaching schedules Most efficient mechanism General Discussion

PhD program in college Report by Dr Osuwan

U S faculty compensation for teaching Discussion led by Dr Osuwan

7 RESEARCH (1 hour, 30 minutes) 2-15

How do we use U S advisor time more efficiently? College hiring person to edit English and style or hiring U S graduate students to visit and aid in thesis writing? Other options?

Discussion led by Dr Scamehorn

Improvement of institutional "memory" of college Is there a mechanism for filing papers obtained by past students in visits to U S libraries? How to encourage students to use past theses/papers as guides in writing? Discussion led by Dr Scamehorn

Timing of thesis completion Can we push it back until June 30 since graduation isn't until July? How coordinate with timing of visit of students to U S ? Discussion led by Dr Scamehorn

Publications resulting from graduate thesis research Who should maintain this list and how do we keep it up to date? Report by Dr Scamehorn

Conflicts between patentable concepts and open presentation of results by students Discussion led by Dr Ishida

Ordering equipment and chemicals directly by Chula and through U S partners Discussion led by Dr Scamehorn

Number of Thai exchange students and length of their visit General Discussion

8 FACILITY DEVELOPMENT (15 minutes)

3.45

Future equipment purchases Report by Dr Osuwan

Library status and future plans Report by Dr Osuwan

E-mail, DHL, and FAX communications Report by Dr Osuwan

9 STUDENTS (30 minutes)

4.00

Recruitment of students for the PhD program Report by Dr Osuwan

Effect of scholarship availability on student quality Report by Dr Osuwan

Recruiting students from surrounding countries Report by Dr Osuwan

Placement office Alumni program Report by Dr Osuwan

10 ADMINISTRATIVE AND MISCELLANEOUS (30 minutes)

4.30

Setting tentative date and location for 1998 annual steering committee meeting

Administration of U S - Chula interactions Subcontracts to U S partner universities
General Discussion

Scheduling visits of faculty and students to U S Improvements in cooperation in planning and timing these visits General Discussion



The Governing Board

Chairman

Professor Thienchay Kiranandana
Chairman
President, Chulalongkorn University

Board Members

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Vice President for Administration
Chulalongkorn University

Professor Somsak Panyakeow
Vice President for Science and Technology Development Affairs
Chulalongkorn University

Associate Professor Narong Yoothanom
Dean Faculty of Engineering
Chulalongkorn University

Professor Sakda Siripant
Dean, Faculty of Science
Chulalongkorn University

Associate Professor Weresak Udomkitchdecha
Director, Metallurgy and Materials Science Research Institute
Chulalongkorn University

Associate Professor Culthorn Silapabanleng
Director, Energy Research Institute
Chulalongkorn University

Associate Professor Wasant Pongsapich
Director environment Research Institute,
Chulalongkorn University

Professor Yongyuth Yuthavong
Director, National Science and Technology Development Agency
Ministry of Science, Technology and Environment

Professor Sippanondha Ketudat
Chairman National Economic and Social Development Board

Professor Prasom Sihapitanonda
Emeritus Professor Chulalongkorn University

Associate Professor Kamchad Mongkolkul
Board Member of Chulalongkorn University Council

Mr Sivavong Changkasiri
Chairman, Petroleum Authority of Thailand

Dr Chokchai Aksaranan
Chairman, The Federation of Thai Industries

Mr Chote Sophonpanich
Chairman Eternal Petrochemical Co Ltd

Mr Narong Chokwatana
Chairman, PAN Group

Mr Yiem Chundprasit
Deputy Managing Director, Thai Oil Co Ltd

Board Member and Secretary

Professor Somchai Osuwan
Director The Petroleum and Petrochemical College

Board Member and Assistant Secretary

Associate Professor Shooshat Baramé,
Deputy Director for Administration
The Petroleum and Petrochemical College

Dr Sumaeth Chavadej or Dr Nantaya Yanumet
Deputy Director
The Petroleum and Petrochemical College



The Executive Board

Advisory Member

Professor Prasom Sthapitanonda
Emeritus Professor, Chulalongkorn University

Professor Padet Sidisunthorn
Emeritus Professor, Chulalongkorn University

Professor Pramote Chaiyavech
National Petrochemical Public Co ,Ltd

Associate Professor Kamchad Mongkolkul
Board Member of Chulalongkorn University Council

Associate Professor Salag Dhabanandana
Chairman Intellectual Property Institute
Chulalongkorn University

Chairman

Professor Somchai Osuwan
Director The Petroleum and Petrochemical College

Board Members

Associate Professor Shooshat Baram
Deputy Director for Administration
The Petroleum and Petrochemical College

Dr Sumaeth Chavadej
Deputy Director for Research Affairs,
The Petroleum and Petrochemical College

Dr Nantaya Yanumet
Deputy Director for Academic Affairs
The Petroleum and Petrochemical College

Mrs Varaporn Kajornchaiyakul
Director, Rubber Research Institute of Thailand

Mr Ieum Ieumwananonhachai
Executive Director
Nitro chemical Industry Co ,Ltd

Associate Professor Kroekchai Sukanjanajtee
Department of Chemical Engineering,
Faculty of Engineering, Chulalongkorn University

Associate Professor Supawan Tantayanon
Department of Chemistry
Faculty of Science Chulalongkorn University

Associate Professor Anuvat Sirivat
Faculty of Petroleum and Petrochemical College
Chulalongkorn University

Assistant Professor Khemchai Hemachandra
Head Department of Materials Science
Chulalongkorn University

Board Member and Secretary

Associate Professor Kunchana Bunyakiat
Department of Chemical Technology
Faculty of Science, Chulalongkorn University

Assistant Secretary

Mrs Suvatcharee Intravichitr
Secretary to the Administrative Office
The Petroleum and Petrochemical College



Cumulative Grade Point Average

Class III (95XXXX)

(Petrochemical Technology)

ID No	Name	Cumulative Grade Point Average	Total Credit Earned
95 1 001	Mr Anawat Sopapong (นายอนวัช โสภางค์)	4 00	36
95 1 002	Mr Chanasit Srisaichua (นายชนสิทธิ์ ศรีสายเชื้อ)	3 18	36
95 1 003	Mr Jiranaree Kotchaphan (น ส จิรนารี คชพันธ์)	3 86	36
95 1 004	Mr Krit Kumpabooth (นายกฤษณ์ คำภาบุตร)	3 59	36
95 1 005	Mr Manat Manantapong (นายมนัส มานันตพงศ์)	3 41	36
95 1 006	Ms Natchira Saimongkol (น ส ณัฐจิรา สายมงคล)	4 00	36
95 1 007	Mr Pakornphant Chantaraviton (นายปรกรณ์พันธ์ จันทรวีฑูร)	3 86	36
95 1 008	Ms Pattama Poonphatanapricha (น ส ปัทมา พูนพัฒน์ปริชา)	3 73	36
95 1 009	Ms Panny Ratanarujanatum (น ส เพณี รัตนโรจนธรรม)	3 73	36
95 1 010	Ms Piyaporn Pongbhai (น ส ปิยะพร ป็องภัย)	4 00	36
95 1 011	Ms Piyarat Wattana (น ส ปิยรัตน์ วัฒนะ)	3 73	36
95 1 012	Ms Rachada Pokhun (น ส รัชดา โพธิ์ขุน)	3 00	36
95 1 013	Mr Rapee Kudisri (นายรพี กุฎีศรี)	3 73	36
95 1 014	Ms Sirirat Chaisin (น ส สิริรัตน์ ไชยสิน)	3 27	36
95 1 015	Ms Sophon Butamjai (นายโสภณ บุตตามใจ)	3 05	36
95 1 016	Mr Supachai Kruayatidee (นายศุภชัย เครือญาติดี)	3 86	36
95 1 017	Mr Supachan Pitchayanont (นายศุภचार พิทยานนท์)	3 73	36
95 1 018	Mr Surat Sakulwongyai (นายสุรัตน์ สกุลวงศ์ใหญ่)	3 73	36
95 1 019	Ms Waraporn Pumpaisanchai (น ส วราภรณ์ พุ่มไพศาลชัย)	3 73	36



Cumulative Grade Point Average
Class III (95XXXX)
(Polymer Science)

ID No	Name	Cumulative Grade Point Average	Total Credit Earned
95 2 001	Mr Anucha Leelertsakulwong (นายอนุชา ลีเลิศสกุลวงษ์)	3 04	39
95 2 002	Mr Apirat Laobuthee (นายอภิรัตน์ เล่าห์บุตร)	3 95	36
95 2 003	Mr Bunyarit Rotchanrat (นายบุญญฤทธิ์ โรจนรัตน์)	3 14	36
95 2 004	Ms Chanintra Pongphour (น ส ชนินทรา พงษ์พั้ว)	4 00	36
95 2 005	Ms Hathaikarn Shoosuwan (น ส หทัยกานต์ ชูสุวรรณ)	3 73	36
95 2 006	Ms Khine Yi Mya (นางคายนี อีเมียง)	3 55	36
95 2 007	Ms Milintra Pokaew (น ส มิลินทรา โพธิ์แก้ว)	3 86	36
95 2 008	Mr Montri Silpa-archa (นายมนตรี ศิลปอาชา)	3 68	36
95 2 009	Ms Naiyana Asawakajana (น ส นัยนา อัสวากัจจนา)	3 59	36
95 2 010	Ms Narumon Phongpisitsakun (น ส นฤมล พงศ์พิศิษฐ์สกุล)	3 86	36
95 2 011	Ms Nattakamol Naiyakul (น ส ณัฐกมล ไนยะกุล)	3 14	36
95 2 012	Ms Patsuda Wongsomnuk (น ส ปัทรสุดา วงศ์สมนึก)	3 27	36
95 2 013	Mr Prasert Prasarnleungwilai (นายประเสริฐ ประสานเหลือองวิไล)	3 59	36
95 2 014	Ms Supranee Kaewpirom (น ส สุปราณี แก้วภิรมย์)	3 68	36
95 2 015	Ms Thanyalak Chaisuwan (น ส ธัญลักษณ์ ฉายสุวรรณ)	3 73	36
95 2 016	Ms Vituruch Goodwin (น ส วิฑูรช์ กู๊ดวิน)	3 86	36
95 2 017	Ms Wanida Siripattanasarakit (น ส วณิดา สิริพัฒนสารกิจ)	3 00	36



**The Petroleum and Petrochemical College
Chulalongkorn University**

**Second Year Cumulative Grade Point Average
Class IV (96XXXX)
(Petrochemical Technology)**

ID No	Name	Cumulative Grade Point Average	Total Credit Earned
96 1 002	Ms Arisara Suthasut (นส อารีตรา สุธาสุทธิ์)	4 00	20
96 1 003	Mr Chongkiat Visetjung (นายจงเกียรติ วิเศษจ้ง)	4 00	20
96 1 004	Ms Dusadeeporn Watanavitukul (นส ดุษฎีพร วัฒนวิฑูกร)	3 53	20
96 1 005	Mr Ittiporn Suwunnamek (นายอิทธิพร สุวรรณเมฆ)	3 68	20
96 1 006	Ms Jiraporn Leerat (นส จิราพร ลีรัตน์)	3 84	20
96 1 007	Mr Kornthape Prasirtsiriphan (นายกรเทพ ประเสริฐศิริพันธ์)	3 16	20
96 1 008	Ms Malee Santikunaporn (นส มาลี สันติคุณากรณ์)	4 00	20
96 1 009	Ms Malinee Leethochawalit (นส มาลินี ลีโหวาลิต)	3 68	20
96 1 011	Ms Napaporn Komesvarakul (นส นภาพร โกเมศวรากุล)	4 00	20
96 1 012	Mr Niwat Athiwattananont (นายนิวัฒน์ อธิพัฒนานนท์)	3 84	20
96 1 013	Ms Pailin Ngaotranwivat (นส ไพลิน เงาตระการวิวัฒน์)	3 53	20
96 1 014	Mr Paisan Lorpongpaiboon (นายไพศาล หล่อพงษ์ไพบูลย์)	3 95	20
96 1 015	Mr Panomkorn Kwakhong (นายพนมกร ขวาทอง)	3 79	20
96 1 016	Mr Patikom Saelee (นายปฏิคม แพรหลิ)	3 00	20
96 1 017	Mr Pisarn Teerasukaporn (นายพิศาล ธีรสุขากรณ์)	4 00	20
96 1 018	Mr Piyapon Hongpaya (นายปิยะพล พงษ์พญา)	3 53	20
96 1 019	Ms Pornkamol Phianpao (นส พรกมล เปลียนเป้า)	3 37	20
96 1 020	Mr Pornthep Santipornvit (นายพรเทพ สันติพรวิทย์)	4 00	20
96 1 021	Ms Sang-Aroon Aowiriyakul (นส แสงอรุณ เออารีระกุล)	3 68	20
96 1 022	Mr Settawat Takulpakdeechoumpon (นายเศรษฐวัฒน์ ตกุลภักดิ์ชุมพล)	3 47	20
96 1 023	Ms Siriporn Jongpatiwut (นส ศิริพร จงผาคิวดี)	3 63	20
96 1 024	Mr Sumate Charoenchaidet (นายสุเมธ เจริญชัยเดช)	4 00	20
96 1 025	Ms Savanit Boonyasuwat (นส สวนิศจ์ บุญญาสุวัฒน์)	3 32	20
96 1 026	Ms Thanyarat Tatiyakiatiskun (นส ธัญญรัตน์ ตติยเกียรติสกุล)	4 00	20
96 1 027	Mr Veerapat Tantayakom (นายวีระภัทร์ ต้นคายาคม)	3 84	20
96 1 028	Mr Thapanawat Nitithanyarattana (นายธูปนวรรรช นิตธิธัญญรัตน์นา)	3 16	20



**The Petroleum and Petrochemical College
Chulalongkorn University**

**Second Year Cumulative Grade Point Average
Class IV (96XXXX)
(Polymer Science)**

ID No	Name	Cumulative Grade Point Average	Total Credit Earned
96 2 001	Ms Anchulee Pisutwimon (น ส อัญชูลี พิสุทธิ์วิมล)	4 00	20
96 2 002	Ms Jeerawan Banyam (น ส จีราวรรณ บานแย้ม)	2 68	20
96 2 003	Ms Jintana Nakarapanich (น ส จินตนา นครพานิช)	3 53	20
96 2 004	Ms Methavee Kwaengsobha (น ส เมธาวี แขวงโสกา)	2 89	20
96 2 006	Ms Pimpa Hormnirun (น ส พิมพ์ หอมนรินทร์)	3 84	20
96 2 007	Ms Piyanun Boonprasert (น ส ปิยนันท์ บุญประเสริฐ)	3 32	20
96 2 008	Ms Rachanee Chungchamroenkit (น ส รัชณี จึงจาเรือกิจ)	3 68	20
96 2 009	Ms Saengpetch Issarapanitchakit (น ส แสงเพชร อิศระพานิชกิจ)	3 68	20
96 2 010	Ms Sawitree Petchuay (น ส สาวิตรี เพชรชาย)	3 84	20
96 2 011	Ms Sumol Stainwongnusa (น ส สุมล เสถียรวงศ์นุษา)	3 47	20
96 2 012	Mr Surakit Chunharotrit (นายสุรกิจ ชุณหโรจน์ฤทธิ์)	3 68	20
96 2 013	Ms Suttinun Phongtamrug (น ส สุธธินันท์ พงษ์ธรรมรักษ์)	4 00	20
96 2 014	Ms Thipa Naiyawat (น ส ทิภา นัยวัฒน์)	4 00	20
96 2 015	Ms Verawan Nerapusri (น ส วีระวรรณ เนระพูสี)	3 53	20
96 2 016	Ms Walaiorn Prissanaroon (น ส วลัยพร ปฤษณารุณ)	3 68	20
96 2 017	Ms Wanpen Tachaboonyakiat (น ส วันเพ็ญ เตชะบุญเกียรติ)	3 53	20
96 2 018	Ms Warunee Klinklai (น ส วาภูมิ กลิ่นไกล)	3 37	20
96 2 019	Ms Watanaporn Pornsriping (น ส วัฒนาพร พรศิริพงษ์)	3 84	20
96 2 020	Ms Watchanida Chinpa (น ส วัชณิดา ชินผา)	3 68	20
96 2 021	Mr Wera Kiettikul (นายวีระ เกียรติกุล)	3 05	20
96 2 022	Mr Wirat Suttavireesan (นายวิรัช สุตทวิเรศ)	3 00	20
96 2 023	Mr Wittaya Lilaiyuthalert (นายวิทยา ลีลาอุทลิต)	3 21	20
96 2 024	Mr Suppawat Suranakapan (นายสุภวัค สุรนาคะพันธุ์)	2 89	20



**The Petroleum and Petrochemical College
Chulalongkorn University**

**Name List of Students
Class V (97XXXX)
(Petrochemical Technology)**

ID No	Name (English)	Name (Thai)
971001	Mr Athapol Kityanan	นายอรรถพล กิตยานันท์
971002	Mr Chalermphol Wongdithnan	นายเฉลิมพล วงศ์ดิษฐานันท์
971003	Mr Chavalit Trakanprapai	นายชวลิต ตระการประไพ
971004	Ms Duangdao Sukjit	นางสาวดวงดาว สุขจิตต์
971005	Ms Janit Pongpuak	นางสาวจณิษฐ์ พงษ์เผือก
971006	Ms Jaruwan Liwsrisakul	นางสาวจารุวรรณ ลิ้วศรีสกุล
971007	Ms Jintana Junsirivilaigul	นางสาวจินตนา จันทร์ศิริวิไลกุล
971008	Mr Kris Wattanakajon	นายกฤษ วัฒนเขจร
971009	Mr Krit Punburananon	นายกฤษฏี พันธุ์บูรณานนท์
971010	Mr Luesak Chakrabandhu	นายลือศักดิ์ จักรพันธุ์
971011	Ms Natthakeeraya Luangpirom	นางสาวณัฐกิริยา เหลืองภิรมย์
971012	Mr Nguyen Anh Duc	นายเหงียน อัน ดึ๊ก
971013	Ms Passawadee Vijtjunya	นางสาวภัสวดี วิจิตรจรรยา
971014	Ms Pattamawadee Phuaphromyod	นางสาวปัทมาวดี พัวพรหมยอด
971015	Mr Prapas Lohateeraparp	นายประภาส โลหะธีรภาพ
971016	Ms Punjaporn Trakultamupatam	นางสาวปัญจพร ตระกูลถ้ำอุปถัมภ์
971017	Ms Ratchadaporn Chaisalee	นางสาวรัชดาภรณ์ ไชยสดี
971018	Mr Rungroj Roonprapun	นายรุ่งโรจน์ รุ่งประพันธ์
971019	Mr Sawad Wongprechasawad	นายสวัสดิ์ วงศ์ปรีชาสวัสดิ์
971020	Mr Siriphong Roatluechai	นายศิริพงษ์ โรจน์ลือชัย
971021	Ms Sukhwan Soontravanich	นางสาวสุขขวัญ สุนทรวานิชย์
971022	Mr Sutee Wongtanakitcharoen	นายสุธี วงศ์ธนาภิเษย์
971023	Mr Sutha Sutthiruangwong	นายสุธา สุทธิเรืองวงศ์
971024	Ms Swe Swe Min	นางสาวชีวะ ชิว หมิน
971025	Ms Tipparat Wamanon	นางสาวทิพย์รัตน์ วามานนท์
971026	Ms Valya Serivalsatit	นางสาววัลยา เสรีวัลย์สถิตย์
971027	Ms Wisakha Phoochinda	นางสาววิสาขา ภู่อินดา



**The Petroleum and Petrochemical College
Chulalongkorn University**

**Name List of Students
Class V (97XXXX)
(Polymer Science)**

ID No	Name (English)	Name (Thai)
972001	Ms Amornrat Lertworasirikul	นางสาวอมรรัตน์ เลิศวรสิริกุล
972002	Mr Amornthep Klongkleaw	นายอมรเทพ คล่องแคล้ว
972003	Ms Anothai Pongsuk	นางสาวอโนทัย พงศ์สุข
972004	Mr Attapon Phraephrewngarm	นายอรรถพล แพร่พรวิงาม
972005	Mr Attawut Kumkrong	นายอรรถวุฒิ คุ้มครอง
972006	Mr Chaiwat Towichayathamrong	นายชัยวัฒน์ ไทวิชยธารง
972007	Ms Kunjana Intharuksa	นางสาวกัญญา อินทร์รักษา
972008	Ms Ladawan Ruangchuay	นางสาวลดาวัลย์ เรืองชวย
972010	Ms Montara Thammachart	นางสาวมนตรา ธรรมชาติ
972011	Mr Narin Kaabbuathong	นายนรินทร์ กาบบัวทอง
972012	Ms Nguyen Thi Thanh Huang	นางสาวเหียงน ถิ ตัน เหียง
972013	Ms Niranchana Kasemsook	นางสาวนริชญนา เกษมสุข
972014	Ms Nungruethai Yoswathananont	นางสาวหนึ่งฤทัย ยศวฒนานนท์
972015	Ms Parichart Limsila	นางสาวปาริชาติ ลิ้มศิลา
972016	Ms Pavena Techakamolusuk	นางสาวปวีณา เตชะกมลสุข
972017	Mr Phairat Phinyawirut	นายไพรัตน์ พิริยวิรุฒม์
972018	Mr Pornpirom Moteplay	นายพรภิรมย์ โหมคพลาญ
972019	Mr Punlop Horharin	นายพัลลภ ฮอหรินทร์
972020	Ms Sukjai Kitikeatsopoan	นางสาวสุใจ กิติเกียรติโสภณ
972021	Mr Tanapatr Barameesangpet	นายธนภัทร บารมีแสงเพชร
972022	Ms Thanaporn Insuan	นางสาวธนาภรณ์ อินสวน
972023	Ms Warawan Prasithphol	นางสาววราวรรณ ประสิทธิ์ผล
972024	Ms Wissanee Charoenpinijkarn	นางสาววิศนีย์ เจริญพินิจการ
972025	Ms Wunpen Chonkaew	นางสาววันเพ็ญ ช้อนแก้ว



Student Profile

	1993 (Total 39)	1994 (Total 35)	1995 (Total 36)	1996 (Total 49)	1997 (Total 52)	1997(Ph D) (Total 4)
Petrochemical Technology major	21	18	19	26	27	2
Polymer Science major	18	17	17	23	25	2
Male	17	12	15	19	22	2
Female	22	23	21	30	30	2
Average age (years)	23	23.4	22.6	22.4	22.6	27.8
Average year of work experience	1.5	0.5	1.4	0.5	0.6	3.5
Grade Point Average	3.09	3.20	3.03	3.00	3.02	3.70
Countries represented	2 (T, U)*	2 (T, C)*	2 (T, M)*	1 (T)*	3 (T, M, V)*	2 (T, M)*

* T = Thailand, U = America, C = China, M = Myanmar, V = Vietnam

Undergraduate major

Aerodynamics	-	1	-	-	-	-
Agricultural Industry	-	-	1	-	-	-
Analytical Chemistry	-	-	-	-	1	-
Biotechnology	-	-	1	-	-	-
Chemical Engineering	22	16	14	22	21	-
Chemistry	6	8	9	11	12	-
Electrical Engineering	1	-	-	-	-	-
Industrial Chemistry	5	2	4	6	6	-
Materials Science	4	7	4	7	9	-
Materials Technology	-	-	-	1	-	-
Mechanical Engineering	-	-	-	1	-	-
Petroleum Chemistry	-	-	-	-	1	-
Petrochemicals and Polymer Materials	-	-	-	-	1	-
Plastic Engineering Technology	1	-	1	1	1	-
Pharmacy	-	1	-	-	-	-
Polymer Science	-	-	2	-	-	-

Graduate major (Ph D Candidate)

Chemical Technology	1
Petrochemical Technology	1
Polymer Science	2



The Name List of Companies and Government Agency Providing Scholarships

Company name	Number of Scholarships				
	1993	1994	1995	1996	1997
Bangkok Bank Public Co , Ltd	-	-	-	1	1
Bangpu Chemicals Co , Ltd	-	1	-	-	-
Banpu Public Co , Ltd	-	1	-	-	-
Caltex Oil (Thailand) Co , Ltd	2	-	-	-	-
Cementhai Chemicals Co , Ltd	-	-	-	3	2
Electricity Generating Authority of Thailand	-	2	1	-	-
Esso (Thailand) Public Co , Ltd	-	1	1	1	-
Eternal Petrochemical Co ,Ltd	-	-	1	1	-
National Petrochemical Public Co , Ltd	2	1	2	1	1
National Science and Technology Development Agency	2	1	2	1	1
National Starch and Chemicals (Thailand) Co ,Ltd	-	-	1	-	-
Petroleum Authority of Thailand	20	10	4	2	5
Premier Group of Companies	2	-	-	2	-
Rayong Refinery Co , Ltd	4	-	-	-	-
Suramaharas Public Co , Ltd	-	-	-	1	-
Thai Oil Co , Ltd	-	2	1	-	-
Thai Olefins Co , Ltd	-	1	2	-	-
Thai Plastic and Chemicals Public Co , Ltd	-	-	1	-	-
The Bangchak Petroleum Public Co , Ltd	-	-	1	-	-
TOA Group of Companies	2	-	1	2	-
Total Exploration and Production Thailand	-	1	-	-	-
Tuntex Co , Ltd	2	-	-	-	-
Total	36	21	18	15	10*

* Information up to June 10,1997

Student Employment after Graduation

	Academic Year		
	1993	1994	1995
Petrochemical Technology			
Chemical Technology Department, Chulalongkorn University	1	-	-
Dow Chemical Thailand Co , Ltd	1	-	-
Electricity Generating Authority of Thailand	-	2	1
Esso Standard (Thailand) Co , Ltd	2	2	2
Eternal Petrochemical Co , Ltd	1	-	-
JJ-Degussa (Thailand) Co ,Ltd	1	-	-
National Petrochemical Public Co , Ltd	4	1	1
PTT Exploration & Production Public Co , Ltd	-	1	-
Rayong Refinery Co , Ltd	2	-	-
Star Petroleum Refining Co , Ltd	-	-	1
Studying Abroad	3	-	1
Studying at PPC	-	-	1
Thai Lube Base Oil Co ,Ltd	-	-	1
Thai Oil Co , Ltd	1	3	2
Thai Olefins Co , Ltd	-	1	1
Thai Plastic and Chemicals (Public) Co , Ltd	-	-	1
Thai Polyethylene Co , Ltd	1	-	-
The Aromatic (Thailand) (Public) Co , Ltd	2	2	2
The Bangchak Petroleum Public Co , Ltd	-	1	2
The Shell Company of Thailand Limited	1	-	-
Tuntex Petrochemical Public Co , Ltd	-	2	-
Others	1	3	3
Total	21	18	19
Polymer Science			
	1993	1994	1995
Apex Petrochemical Co , Ltd	1	1	-
Bank of Thailand	2	-	-
Burapha University	-	-	1
Damala Sulee Co , Ltd	-	1	-
Dow Chemical Thailand Co , Ltd	1	-	-
Eternal Petrochemical Co ,Ltd	-	-	1
International Cosmetic Co , Ltd	1	-	-
JJ-Degussa (Thailand) Co ,Ltd	1	-	-
Jotun (Thailand)	1	-	-
King Mongkut Institute of Technology, Thonburi	-	-	3
National Petrochemical Public Co , Ltd	-	-	1
National Science and Technology Development Agency	-	1	-
Petroleum Authority of Thailand	-	1	1
Premier Products Co , Ltd	1	-	-
Seagate (Thailand) Co , Ltd	1	-	-
Siam Fiberglass Co , Ltd	-	1	-
Studying Abroad	1	-	1
Studying at PPC	-	-	2
Submicron Technology Co , Ltd	1	7	-
Thai Olefins Co , Ltd	-	1	-
Thai Petrochemical Industry Co ,Ltd	2	1	-
Thai Polyacetal Co ,Ltd	-	-	1
Thai Polycarbonate Co ,Ltd	-	1	1
The Aromatic (Thailand) (Public) Co , Ltd	2	-	-
TOA Group of Companies	1	-	1
Others	2	2	4
Total	18	17	17



GUEST SPEAKERS AND SEMINARS

1996

- July 16** **Dr Santi Kulprathipanja**
UOP Co , Ltd , USA
"Industrial Separation Technology"
- August 6** **Dr David C Martin**
Department of Materials Science and Engineering
University of Michigan, USA
"Thermally Crosslinkable Flame Resistant Copolymers"
- August 22** **Dr Lance L Lobban**
School of Chemical Engineering and Materials Science
University of Oklahoma, USA
"Low Temperature Methane Conversion Using Electric Discharges"
- September 16** **Dr Erdogan Gulari**
Department of Chemical Engineering
University of Michigan, USA
"Polyolefin Synthesis Catalysis"
- October 2** **Dr H Scott Fogler**
Department of Chemical Engineering
University of Michigan, USA
"Kinetics of Silica Particle Formation in Nonionic W/O Microemulsions from Tetraethyl Orthosilicate"
- December 27** **Dr Ralph T Yang**
Department of Chemical Engineering
University of Michigan, USA
*"New Adsorbents for Gas Separation by Chemical Completion and
"Electron Microscopy Studies of Gas-Carbon Reactions"*

1997

- January 13** **Dr John F Scamehorn**
School of Chemical Engineering and Materials Science
University of Oklahoma, USA
"Removal of Dissolved Pollutants from Water Using Colloid-Enhanced Ultrafiltration Techniques"
- January 16** **Dr Jules J C Picot**
Chemical Engineering Department
University of New Brunswick, Canada
"Polymer, Orientation and Processing"
- February 5** **Dr Malika J Punyagupta**
Lever Brothers (Thailand) Company Limited
Polymer as Rheology Modifiers in Consumer Products"

- February 12** **Dr Carlos Tiu**
 Department of Chemical Engineering
 Monash University, Australia
"Steady and Dynamic Rheology of A Thermotropic Liquid Crystalline Polymer and its Blends"
- April 9** **Dr Wirojana Tantraporn**
 Premier Group of Companies
"The Role of Research and Development in The Future of Thai Industries"
- April 11** **Mr Tom Loughney**
 The Dow Chemical Co , Ltd , USA
"Development Properties and Applications of Disulfonate Surfactants (Dowfax) "
- April 23** **Dr Wirat Sakornwimon**
 Bangkok Synthetics Co , Ltd
"Petrochemical from Mixed C₄"
- April 23** **Dr Waraphat Arthayukti**
 Unocal Thailand Co , Ltd
"Natural Gas"
- April 24** **Dr Pramote Chaiyavech**
 National Petrochemical Public Co , Ltd
"Petrochemical Industry"
- April 30** **Mr Parut Chatikavanij**
 Esso (Thailand) Public Co , Ltd
"Petroleum Industry"
- May 7** **Mr Lek Kulapaditharom**
 Thai Olefins Co , Ltd
"Olefin Plants"
- May 7** **Dr Thevarak Rochanapruk**
 Thai Plastic and Chemical Co , Ltd
"PVC Production"
- May 29** **Dr James O Wilkes**
 Department of Chemical Engineering
 University of Michigan, USA
"Water-flooding in Stratified Oil Reservoirs "
- June 4** **Dr Hatsuo Ishida**
 Department of Macromolecular Science
 Case Western Reserve University, USA
"A New Class of Phenolic Resins with Superb Balance of Mechanical and Physical Properties Ideal Combination of Phenolic, Epoxy and Polyimide Resins"



Short Courses in 1996

No	Title	Course Instructor	Date	No of Companies	No of Participants
1	Plastics Materials, Processing and Testing	Mr John W Ellis The Petroleum and Petrochemical College	January 24-25, 1996	26	39
2	Plastics Materials, Compounding and Processing	Mr John W Ellis The Petroleum and Petrochemical College	February 7-9, 1996	2	23
3	Plastics Materials, Compounding, Processing and Testing	Mr John W Ellis The Petroleum and Petrochemical College	March 12-14, 1996	23	32
4	Mechanical Properties and Reliability of Polymeric Materials	Dr Witold Brostow The University of North Texas, USA	March 20-21, 1996	6	10
5	The Petrochemical and Polymer Industries Technology and Economics	Dr Harold A Wittcoff Chem Systems Inc , USA	May 8-10, 1996	17	32
6	Computer-based Tools for Managers and Engineers	Dr Vira Chankong Case Western Reserve University, USA	May 13-15, 1996	10	21
7	Injection Mould Design	Mr John W Ellis The Petroleum and Petrochemical College	May 22-23, 1996	16	21
8	Applied Surfactant Science and Technology	Dr Jeffrey H Harwell and Dr John F Scamehorn University of Oklahoma, USA	July 23-25, 1996	10	15
9	Heterogeneous Catalysis Fundamentals, Industrial Applications and Frontiers	Dr Lance L Lobban and Dr Richard G Mallinson University of Oklahoma, USA	August 26-28, 1996	8	15
10	Blow Moulding Technology	Mr John W Ellis, PPC	September 18-19, 1996	21	38
11	Cogeneration and Combined Cycles More Efficient Use of Energy in Thailand	Dr Frank R Steward, Mr D H Cameron and Mr B Kennedy University of New Brunswick, Neil and Gunthers Inc and NB Power, Canada	October 8-10, 1996	34	39
12	Plastics Materials, Compounding, processing and Testing	Mr John W Ellis The Petroleum and Petrochemical College	November 12-14, 1996	24	32
Total				197	317



Short Courses in 1997

No	Title	Course Instructor	Date	No of Companies	No of Participants
1	Process Improvement and Quality Assurance	Dr Tep Sastri Texas A&M University, USA Dr Vira Chankong Case Western Reserve University, USA	January 8-10, 1997	29	40
2	Compression and Transfer Moulding	Mr John W Ellis The Petroleum and Petrochemical College	January 29-30, 1997	6	7
3	The Petrochemical and Polymer Industries Technology and Economics	Dr Harold A Wittcoff Chem Systems Inc , USA	February 17-19, 1997	24	35
4	Process Quality Monitoring and Improvement	Dr Tep Sastri Texas A&M University,USA	May 14-16, 1997	15	20
5	Applied Surfactant Science and Technology	Dr Jeffrey H Harwell and Dr John F Scamehorn University of Oklahoma, USA	June 18-20, 1997		
6	Plastics Materials, Compounding, Processing and Testing	Mr John W Ellis The Petroleum and Petrochemical College	August 6-7, 1997		
7	Computer-Based Tools for Managers and Engineers	Dr Vira Chankong Case Western Reserve University, USA	July 23- 25, 1997		
8	Natural Gas Processing	Dr Amit Chakma The University of Regina, Canada	November 17-21, 1997		
9	The Petrochemical and Polymer Industries Technology and Economics	Dr Harold A Wittcoff Chem Systems Inc , USA	December 11-12, 1997		
Total				74	102

Papers Published and Accepted for Publication (12 papers)

Thammanthadanukul, V , O'Haver, J H , Harwell, J H , Osuwan, S , Na-Ranong, N , and Waddell, W H , "Comparison of Rubber Reinforcement Using Various Surface-Modified Precipitated Silicas", Journal of Applied Polymer Science, 59, 1741 (1996)

Tharapiwattananon, N , Scamehorn, J F , Osuwan, S , Harwell, J H , and Haller, K J , "Surfactant Recovery from Water Using Foam Fractionation", Separation Science and Technology, 31, 1233 (1996)

Bhummasobhana, A , Scamehorn, J F , Osuwan, S , Harwell, J H , and Baramée, S , "Surfactant-Enhanced Carbon Regeneration in Liquid Phase Application", Separation Science and Technology, 31, 629 (1996)

Kittiyanan, B , O'Haver, J H , Harwell, J H , and Osuwan, S , "Adsolubilization of Isoprene and Styrene in Adsorbed Cetyltrimethylammonium Bromide Bilayers on Precipitated Silica", Langmuir, 12, 2162 (1996)

Daniels, R D , Scamehorn, J F , and Osuwan, S , "New Graduate Programs in Petrochemical Technology and in Polymer Science at Chulalongkorn University, Bangkok, Thailand - An International Academic Partnership", Proceedings of the 1996 Annual American Society of Engineering Education Meeting, Session 2260 (1996)

Srivannavit, O , Osuwan, S , and Gulari, E , "Low Temperature CO Oxidation by Cobalt Oxide Supported Silver Catalysts", Proceedings of the Fifth World Congress of Chemical Engineering, 3, 507-512 (1996)

Wungrattanasopon, P , Scamehorn, J F , Chavadej, S , Saiwan, C , and Harwell, J H , "Use of Foam Flotation to Remove Tert-Butylphenol from Water", Separation Science and Technology, 31, 1523 (1996)

Sriratana, S , Scamehorn, J F , Chavadej, S , Saiwan, C , Haller, K J , Christian, S D , and Tucker, E E , "Use of Polyelectrolyte-Enhanced Ultrafiltration to Remove Chromate from Water", Separation Science and Technology, 21, 2493 (1996)

Srivat, A , Kanatharana, J , Sukpisarn, J and Wang, S Q , "On the Correlation between the Viscosity of Partially Hydrolyzed Polyacrylamide Solution and the Diffusion Coefficient in the Semidilute Regime", Polymer Engineering and Science, 36, No 24 (1996)

Tayaniphan, S , Dhumrongvaraporn, S , Waldner, K , and Laine, R M , "Synthesis of Spinel Precursor Directly from Al₂O₃ and Tri-Ethanolamine", Chemistry of Materials, 8, 2850-2857 (1996)

Pairat, R , Chavadej, S , Fogler, H S and Browning F H , "Precipitation and Dissolution of Calcium - ATMP Precipitates for the Inhibition of Scale Formation in Porous Media", Langmuir, 13, 1791 (1997)

Pongstabodee, S, Scamehorn, J F , Chavadej, S , and Harwell, J H , "Clean-up of Oily Waste Water by Froth Flotation Effect of Microemulsion Formation", Separation Science and Technology, In Press

Papers Submitted for Publication (12 papers)

Thovanich, K , Sirivat, A and Wang, S Q , "Viscometric and Dynamic Light Scattering Studies of Dilute Poly(methacrylic acid) Solutions", Journal of Polymer Science, Physics Edition, Submitted

Kanarathana, J , Sukpisarn, J , Sirivat, A and Wang, S Q , "Viscosity and the Diffusion in Solutions of the Hydrolyzed Polyacrylamides Effects of the Degree of Hydrolysis, the Ionic Strength and the Solvent Quality", Macromolecules, Submitted

Chuchepchukamon, W , Osuwan, S , Vitisan, T , and Gulari, E , "Low Temperature Total oxidation of Ethylene on Cobalt Oxide Supported Silver", Journal of Applied Catalysis, Submitted

Sze, C , Gulari, E , Srinnavit, O , and Osuwan, S , "Ultra High Activity CO Oxidation Catalysts", Journal of Applied Catalysis, Submitted

Phanchaipeth, P , Dhumrongvaraporn, S , and Lane, R M , "Synthesis of Silatrane Complexes from Solica", Journal of American Chemical Society, Submitted

Thamsatiman, P , Harwell, J H , Osuwan, S , Chavadej, S , and Sabatini, D A , "Surfactant Adsorption and Soil Decontamination Using Model Soils Part I Negatively Charged Soil Model", Water Research, Submitted

Rattiwat, T , Harwell, J H , Osuwan, S , Chavadej, S , and Sabatini, D A , "Surfactant Adsorption and Soil Decontamination Using Model Soils Part II Positively Charged Soil Model", Water Research, Submitted

Booncharoensuk, P , Harwell, J H , Osuwan, S , Chavadej, S , and Sabatini, D A , "Surfactant Adsorption and Soil Decontamination Using Model Soils Part III Hydrophobic Soil Model", Water Research, Submitted

Chintanasathien, C , Rodriguez, C H , Scamehorn, J F , Saiwan, C , and Chavadej, S , "Precipitation of Solutions Containing Mixtures of Synthetic Anionic Surfactant and Soap", Journal of the American Oil Chemists' Society, Submitted

Kimchuwant, W , Scamehorn, J F , Osuwan, S , Haller, K J , and Harwell, J H , "Use of a Surfactant Coacervate Phase to Extract Trichloroethylene from Water", Langmuir, Submitted

Thakulsukanant, C , Lobban, L L , Osuwan, S , and Waritswat, A , "Adsolubilization and Stability Characteristics of Hydrocarbon Aggregate Chemically Bonded to Porous Silica", Langmuir, Submitted

Sukpisan, J , Kanathanara, J , Sirivat, A , and Wang, S Q , " The Specific Viscosity of Partially Hydrolyzed Polyacrylamide Solutions Effects of the Degree of Hydrolysis, Molecular weight, Solvent Quality and Temperature" , J Polym Sci, Part B, Polymer Physics, Submitted

Presentations (33 papers)

Tayaniphan, S , Dhumrongvaraporn, S , and Laine, R M , "Modification of Spinel Polymer Precursor with Glycerol", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Punchaipetch, P , Dhumrongvaraporn, S , and Laine, R M , "Synthesis of - [N(CH₂CH₂O)₃Si-OCH₂CH₂O]_n-, A Silatrane, Directly from Silica", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Dhumrongvaraporn, S , Tayaniphan, S , Laine, R M , and Waldner, K F , "Synthesis of an Alkoxide Precursor to Spinel (MgAl₂O₄) Directly from Al(OH)₃ and MgO", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Petchsuk, A , Dhumrongvaraporn, S , and Laine, R M , "Synthesis of Alumatrane Oligomers", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Suwankrughasn, M , Dhumrongvaraporn, S , and Laine, R M , "Properties of Silatrane Glycolate Polymer", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Viboonrungsan, S , Petchsuk, A , Dhumrongvaraporn, S , and Laine, R M , "Properties of Alumatrane Oligomers", 3rd International Conference on Frontiers of Polymers and Advanced Materials, Kuala Lumpur, Malaysia (January, 1995)

Kanatharana, J , Sukpisan, J , Wang, S Q and Sirivat, A , "Concentration Dependence of the Solution Viscosity and the Relaxation Time of the Partially Hydrolyzed Polyacrylamide", 209th American Chemical Society, Anaheim, California (April, 1995)

Nawadhinsukh, P , Saiwan, C , Tantayanon, S , and Ishida, H , "Investigation of Phenolphthalein Based Polybenzoxazine under Curing", 21st Congress on Science and Technology of Thailand, Chonburi, Thailand (October 1995)

Saiwan, C , Aussawasathiew, D , Tantayanon, S , and Ishida, H , "Synthesis of Benzoxazine Based Phenolic Derivatives", 21st Congress on Science and Technology of Thailand, Chonburi, Thailand (October 1995)

Bhummasobhana, A , Scamehorn, J F , Harwell, J H , Osuwan, S , and Baramée, S , "Use of Surfactant-Enhanced Carbon Regeneration for Wastewater Applications", American Institute of Chemical Engineers Annual Meeting, Miami Beach (November, 1995)

Piboonchaisit, P , Dhumrongvaraporn, S , Laine, R M , "Silatrane Complexes from SiO₂ and Triisopropanolamine", 4th International Conferences on Polymer Characterization, University of North Texas, U S A (January, 1996)

Presentations (Continued)

Rangsitphol, J , Dhumrongvaraporn, S , Laine, R M , "Synthesis of Aryloxysilane, Liquid Crystal Precursor, Directly from SiO₂ and Catechol", 4th International Conferences on Polymer Characterization, University of North Texas, U S A (January, 1996)

Sirivat, A , Kanatharana, J and Sukpisan, J , "On the Correlation between the Viscosity of Partially Hydrolyzed Polyacrylamide Solution and the Diffusion Coefficient in the Semidilute Regime", 4th International Conference on Polymer Characterization, Denton, Texas (January, 1996)

Opornsawad, Y , Dhumrongvaraporn, S , Laine, R M , "The Synthesis of Alumatrane Complexes Directly from Al(OH)₃ and Triisopropanolamine", 4th International Conferences on Polymer Characterization, University of North Texas, U S A (January, 1996)

Kimchuwanit, W , Scamehorn, J F , Osuwan, S , Haller, K J , and Harwell, J H , "Use of a Surfactant Coacervate Phase to Extract Trichloroethylene from Water", 211th American Chemical Society National Meeting, New Orleans (April, 1996)

Gulari, E , Sze, C , Srivannavit, O , and Osuwan, S , "A New Class of Air Cleaner Catalysts", Warsaw Conference on the Environment, Warsaw, Poland (April, 1996)

Rodriguez, C H , Scamehorn, J F , Chintanasathien, C , Sarwan, C , and Chavedej, S , "Precipitation of Solutions Containing Mixtures of Synthetic Anionic Surfactant and Soap", 87th Annual American Oil Chemists' Society Meeting, Indianapolis (April, 1996)

Daniels, R D , Scamehorn, J F , and Osuwan, S , "New Graduate Programs in Petrochemical Technology and in Polymer Science at Chulalongkorn University, Bangkok, Thailand - An International Academic Partnership", Annual American Society of Engineering Education Meeting, Washington (June, 1996)

Srivannavit, O , Osuwan, S , and Gulari, E , "High Activity CO Oxidation Catalysts", Proceedings of the Fifth World Congress of Chemical Engineering, (July, 1996)

Kanchanasopa, M , Yanumet, N , and Ishida, H , "The Effect of Curing Conditions on the Volumetric Expansion of Bisphenol-A and Aniline-Based Polybenzoxazine", 212th American Chemical Society National Meeting, Orlando (August, 1996)

Gulari, E , Sze, C , Srivannavit, O , Srivannavit, S , and Osuwan, S , "Synthesis and Characterization of Ultra High Activity Low Temperature CO Oxidation Catalysts", American Institute of Chemical Engineers Annual Meeting, San Francisco (November, 1996)

Arthasart, Y , Trakulcoo, K and Martin, D C , "The Influence of Reprocessing History on the Properties of High Density Polyethylene (HDPE)", PPS96 Conference on Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Kumcharoen, C , Trakulcoo, K and Martin, D C , "The Influence of Processing History on the Fracture Surfaces of HDPE, HDPE and PET Blends, Nylon 6, 6 and PEI", PPS96 Conference on Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Presentations (Continued)

Jensuksup, P , Trakulcoo, K and Martin, D C , “Characterization of Reprocessed HDPE and PET Blends Comparison Between Binary Blends and Ternary Blends with Maleated Polyolefin Compatibilizer”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Chaluyadumrong, S , Trakulcoo, K and Martin, D C , “Reprocessing of Engineering Thermoplastics (Nylon, PEI, POM) Effects on Thermo-Physical Properties”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Thienthanawanith, K , Trakulcoo, K and Martin, D C , “Reprocessing of Engineering Thermoplastics (Nylon, PEI, POM) Effects on the Mechanical Properties”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Tuntayanupon, M , Trakulcoo, K and Gulari, E , “An Experimental Study of Permeation of Representative Gasoline Components Through HDPE Film”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Sirivat, A and Polnak, R , “The Effect of HDPE/LDPE Blend Composition on the Melt Flow Instability and Extrudate Textures”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Wongsomnuk, P and Sirivat, A , “The Effect of Molecular Weight of LLDPE on the Characteristics of the Melt Flow Oscillating Regimes”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Nayakul, N and Sirivat, A , “The Effect of varying HDPE/PP Blend Composition on the Characteristics of the Melt Flow Oscillating Regimes”, PPS96 Conference in Polymer Processing Towards AD 2000, Singapore, November 26-28, 1996

Silpa-archa, M , Dhumrongvaraporn, S and Laine, R M , “One Step Synthesis of Liquid Crystalline Copolymer Directly from SiO₂, Catechol and Hydroquinone”, International Conference on Polymer Characterization, University of North Texas, Denton, TX, January 8-10, 1997

Laobuthee, A , Dhamrongvaraporn, S and Laine, R M , “Elementary Study of the Microstructural Evolution During Sintering of Ceramic Precursor to Spinel”, International Conference on Polymer Characterization, University of North Texas, Denton, TX, January 8-10, 1997

Mya, K Y and Sirivat, A , “A Study of Complex Formation between PAM and Triton X100”, APS Annual Meeting - Division of High Polymer Physics, Kansas City, MO (March 1997)

COVER PAGE
Science and Technology Higher Education Development Project
Ministry of University Affairs

Title of the Proposed Project		Postgraduate Education and Research Programs in Petroleum and Petrochemical Technology	
Priority Area		Engineering and Materials Science	
Requested Amount	444,000,000 Baht	Proposed Duration	5 years
		Request Starting Date Jan 1997 Dec 2001	
Consortium Partnerships			
Thailand:			
Lead university	Chulalongkorn University	Faculty 1 Petroleum and Petrochemical College	
		Faculty 2 Department of Chemical Technology Faculty of Science	
Partner University	Kasetsart University	Faculty 1 Department of Chemistry Faculty of Science	
		Faculty 2 Department of Chemical Engineering Faculty of Engineering	
International Collaborating Institutions			
Foreign University	1 Univ of Michigan	Contact Person/Fax	Ralph T Yang / (313) 763-0459
Foreign University	2 Univ of Oklahoma	Contact Person/Fax	Jeffrey H Harwell / (405) 325-5813
Foreign University	3 Case Western Reserve Univ	Contact Person/Fax	Alex Jamieson / (216) 368-4164
Foreign University	4 Inst du Genie Chimique	Contact Person/Fax	Gilbert Casamatta / 62 25 23 18
Foreign University	5 Oregon State Univ	Contact Person/Fax	George H Keller / 541 737 3093
Foreign University	6 Innsbruck Univ	Contact Person/Fax	Michael Probst / (0512) 507 2934
Foreign University	7 Tohoku Univ	Contact Person/Fax	Akira Tomita / 022 223-8956
Foreign University	8 Univ of Queensland	Contact Person/Fax	Paul Lant / +61 7 33654726
Foreign University	9 Bordeaux Univ	Contact Person/Fax	P V Huong / 33 56 84 84 02
Foreign University	10 Washington Univ	Contact Person/Fax	P A. Ramachandran/ 314 9357211
Principal Investigator			
Lead PI/Contact Person		PI Postal Address	
Professor Somchai Osuwan		Petroleum and Petrochemical College Chulalongkorn University Phyathai Road Bangkok 10330 Thailand	
PI Name	Highest Degree, Yr	University	Tel/Fax/E-Mail
1 Lead PI Prof Somchai Osuwan	Ph D 1971	Univ of New Brunswick Canada	Tel (662) 218-4100 Fax (662) 215-4459 E Mail osuwan@chulkn car chula ac th
2 Co-PI/Coordinator Assoc Prof Kunchana Bunyakiat	M S , 1969	Univ of Saskatchewan Canada	Tel (662) 218-5326 Fax (662) 255 5831 E-Mail fscikbk@chulkn chula ac th
3 Co-PI/Coordinator Assoc Prof Jumras Limtrakul	Ph D , 1984	Innsbruck Univ Austria	Tel (662) 9428034 35 Fax (662) 579 3955 E-Mail jumras@chem scs.ku ac.th
4 Co-PI/Coordinator Dr Terdthai Vatanatham	Ph D 1979	Univ of Akron USA	Tel (662) 561-4621 Fax (662) 579 2083 E-Mail fengttv@nontrn ku ac th

Summary of Research Grants

Budget Year	Source	Project Type	Project Numbers	Budget (Baht)
1991	Thai Government	Faculty	3	420,000
1992	Thai Government	Faculty	4	641,920
1993	Thai Government	Faculty	3	574,300
1994	Thai Government	Faculty	4	818,000
1995	Thai Government NRC MTEC	Faculty	4	701,400
		Graduate Student	17	510,000
		Contract	1	1,053,270
			Total	<u>2,264,670</u>
1996	Thai Government NRC NRC PTT	Faculty	5	1,096,900
		Graduate Student	18	720,000
		Faculty	4	1,085,500
		Thesis	6	904,610
			Total	<u>3,807,010</u>
1997	Thai Government NRC Lever Brothers PTT TRF MTEC	Faculty	4	1,290,000
		Graduate Student	22	880,000
		Contract	1	108,000
		Contract	2	1,420,000*
		Contract	1	1,992,000*
		Contract	1	4,250,400*
			Total	<u>9,940,400</u>

* Proposed
 NRC National Research Council
 PTT Petroleum Authority of Thailand
 TRF The Thailand Research Fund
 MTEC National Metal and Materials Technology Center

**List of Research Grants Supported by National Research Council in 1995
(Graduate Student Type)**

No	Thesis Title	Student Name	Budget (Baht)
1	Precipitation in Solutions Containing Mixtures of Synthetic	1 Mr Chanin Chintanasathuen	30,000
2	Gasous Fuels Storage on Adsorbents Part Ethane	1 Ms Nataya Pariyaprasit	30,000
3	Cleanup of Oily Waste Water using Froth Flotation	1 Mr Pukpong Wangrattanasopon	30,000
4	Comparison of Rubber Reinforcement using Various	1 Ms Valeeporn Thammathadanukul 2 Mr Boonyarch Kitriyanan	30,000
5	Use of Coacervate to Extract Volatile Solutes from Water	1 Mr Warophat Kimchuwanit	30,000
6	Use of Surfactants in Soil Cleaning	1 Ms Panida Thamsatitman 2 Ms Patchara Booncharoensuk 3 Ms Teeraporn Rattiwat	30,000
7	Low Temperature Carbon Monoxide and Hydrocarbon by	1 Mr Wiboon Chuhepchunkamon 2 Mr Onnop Srivannavit	30,000
8	Use of Surfactant-Enhanced Carbon Regeneration (SECR) in Liquid Phase Application	1 Mr Anawat Bhummasobhana	30,000
9	Use of Surfactant-Enhanced Carbon Regeneration in Vapor Phase Application	1 Mr Pratuck Udarwudhupong	30,000
10	Clean Up of Permeate from Micellar Enhance Ultrafiltration	1 Ms Nopparat Tharapiwattananon	30,000
11	Catalyst Development for Polyethylene and Polypropylene Synthesis	1 Ms Kanyarat Sriprutkiat	30,000
12	The Synthesis of Alumatrane Polymer from Alumina and Amines	1 Ms Atisa Petchsuk	30,000
13	The Expansion and Near Zero Volumetric Shrinkage of the Benzoxazine-based Phenolic Resin	1 Ms Darunee Aussawathien	30 000
14	Phenolic Material via Ring-Opening Polymerization of Benzoxazines Kinetic Study and Improved Mechanical Properties of Benzoxazine Precursors	1 Ms Nitinat Suppakarn 2 Ms tharinee Srithawat Na Ayudya	30,000
15	Synthesis of Silatrane Comp O ₄ MgO lexes from SiO ₂ and TEA	1 Ms Prakaipecth Puchaipetch	30,000
16	Modification of Alumatrane Polymer from Alumatrane and Amines	1 Ms Supaluck Viboonrungsan	30 000
17	A Ceramic/polymer Composite from MgAl ₂ O ₄ MgO, Al (OH) ₃ and Triethanolamine	1 Ms Sureeorn Tayaniphan	30,000
Total			<u>510,000</u>

**List of Research Grants Supported by National Research Council in 1996
(Graduate Student Type)**

No	Thesis Title	Student Name	Budget (Baht)
1	Use of Surfactant-Enhanced Carbon Regeneration (SECR) in Vapor Phase Application	1 Ms Thanyaboon Sutad Na Ayoothaya	40 000
2	The Study of Methane Conversion under the Influence of an AC Electric Discharge	1 Mr Khanti Thanyachotpaiboon	40,000
3	Clean-up of Oily Waste Water by Using Froth	1 Ms Sangobtip Pongstabodee	40,000
4	Study of Precipitation and Dissolution of Calcium-Phosphonates in the Porous Media	1 Mr Parat Rerkpattanapipat	40,000
5	Catalyst Development for Polypropylene Synthesis	1 Ms Rattanawalee Sukonrat	40 000
6	Development and Characterization of CO Oxidation and NO Reduction Catalysts for Catalytic Cleaning	1 Mr Suchart Powattanasatiant	40 000
7	Propane Dehydrogenation Over Platinum Catalyst Influence of Promoters on Activity and Coking	1 Ms Kamolwan Wongkolkitslip	40,000
8	Propane Dehydrogenation Over Platinum Catalyst Decoking Performance	1 Mr Opart Charuratana	40 000
9	Kinetic of Aggregation and Growth of Model Silica	1 Ms Acharee Siriwongse	40,000
10	The Study of Dissolution of Ashaltenes and Parafins	1 Ms Pornruedee Permsukarome	40 000
11	Low Temperature Carbon Monoxide by Manganese Oxide Supported Silver Catalyst	1 Mr Sompop Srivannavit	40 000
12	Use of Surfactant-Enhanced Carbon Regeneration in Liquid Phase	1 Mr Supruk Siristhichote	40 000
13	Comparison of Rubber Reinforcement Using Various Surface Modified Sikicas	1 Ms Nisachon Chunpan	40,000
14	The Oxygen Storage Catalyst	1 Mr Jeerawat Pattanasomsit	40 000
15	Catalyst for Total Combustion	1 Mr Sarunyu Kimwongse	40,000
16	The Role of Silane Coupling Agent in the Reinforcement Mechanism of Fiberglass Reinforced Unsaturated Polyester in the Presence of Sizing Agent	1 Ms Pachreeya Kulanuch	40 000
17	A Study on Volumetric Expansion of Polymerization	1 Ms Mantana Kanchanasopa	40,000
18	Study of Polybenzoxazine Adhesive for Alumina	1 Ms Sawitree Buranapaiboon	40 000
Total			720,000

**List of Research Grants Supported by
National Research Council in 1997
(Graduate Student Type)**

No	Thesis Title	Nome of Student	Budget (Baht)
1	Influence of Carbon Black Aggregate Structure on Agglomerate Dispersion Behavior	Mr Anucha Leelertsakulwong	40,000
2	Precipitation Kinetics and Dissolution of Scale Inhibitors in the Presence of Multiple Cations	Ms Priyarat Wattana	40,000
3	The Study of Dissolution Kinetics of Asphaltenes	Ms Waraporn Pumpaisanchai	40 000
4	Characterization of Platinum Catalysts Adsorption and TPD of Oxygenated Compound	Mr Pakornphant Chantaraviton	40,000
5	Influence of Carbon Black Aggregate Structure on Packing Characteristic and Agglomerate Cohesivity	Mr Prasert Prasarnleungwirai	40,000
6	The Synthesis of Liquid Crystalline Copolymers Directly from Silica, Catechol and 4-tert Butylcatechol	Ms Narumon Pongpitsakun	40,000
7	The Performance of an Ion Exchange Column	Mr Manat Manantapong	40,000
8	Development of New Ion Separation Membrane using Host-Guest Properties of the Polybenzoxazine Local Structure	Ms Wanida Siripattanasarakit	40 000
9	Use of Froth Flotation to Remove Oil from Wastewater Under Microemulsion Conditions	Ms Penny Ratanarojanatom	40 000
10	Synthesis and Processing of Polymers from SiO ₂ and 1,2 diol	Ms Thanyalak Chaisuwan	40 000
11	The Synthesis of Liquid Crystalline Copolymers Directly from SiO ₂ , Catechol and Hydroquinone	Mr Montri Silpa-Archa	40 000
12	Study of Agglomeration Reducing method of Magnesium Aluminate during Sintering Process	Mr Apirat Laobuthee	40 000
13	Application of Polybenzoxazine for Natural Fiber Reinforced Plastic	Ms Vituruch Goodwin	40,000
14	Effect of Pore Diameter on Surfactant Adsorption Isotherms	Mr Chanasit Srisaichua	40 000
15	Propane Dehydrogenation Over Platinum Catalyst Decoking Performance	Mr Supachai Kruayattidee	40,000
16	Propane Dehydrogenation Over Platinum Catalyst Influence of Promoters on Activity and Coking	Ms Natchura Saimongkol	40 000
17	Characterization of Pd-Ag/Al ₂ O ₃ Hydrogenation Catalyst	Ms Piyaporn Pongbhai	40 000
18	Use of Liquid-Coacervate Extraction to Remove Volatile Organics from Water	Mr Surat Sakulwongyai	40,000
19	Surfactant Recovery form Water Using Foam Fractionation	Mr Krit Kumpabooh	40,000
20	Activity and Selectivity Enhancement of HDS Catalysts	Mr Anawat Sopapong	40 000
21	Catalyst Development for Polystyrene Synthesis	Mr Supachan Pichayanont	40 000
22	Development and Characterization of NO Reduction and CO Oxidation for Catalytic Cleaning of Diesel Engine Exhaust Emissions	Ms Jiranaree Kotchaphon	40 000
Total			880,000

**List of Research Grants Supported
by Petroleum Authority of Thailand (PTT) in 1996**

Thesis Title	Student Name	Budget (Bath)
1 Development and Characterization of NO Reduction and CO Oxidation for Catalytic Cleaning of Diesel Engine Exhaust Emissions	Jiranaree	187,900
2 Characterization of Pd-Ag/Al ₂ O ₃ Hydrogenation Catalysts	Piyaporn	185,610
3 Activity and Selectivity Enhancement of HDS Catalysts	Anawat	195,500
4 Use of Froth Flotation to Remove Oil from Wastewater	Penny	96,400
5 Precipitation Kinetics and Dissolution of Scale Inhibitors in the Presence of Multiple Cations	Piyarat	97,000
6 Methane Conversion in an Electric Discharge	Pattama	142,200
Total		<u>904,610</u>

**List of Research Grants Supported by National Research Council in 1996
(Specified Topics Type)**

Title	Project Members	Budget (Baht)
1 Formation of Hydrocarbon and Fluorocarbon Aggregates Chemically Bonded on Metal Oxide Surfaces	1) Prof Somchai Osuwan 2) Assoc Prof Lance L Lobban 3) Dr Sumaeth Chavadij	263,760
2 Development of Silver Catalyst of Disinfection	1) Dr Sumaeth Chavadij 2) Prof Erdogen Gulari	260,200
3 Permeation of Organic Solvent Blends Through High Density Polyethylene (HDPE)	1) Assoc Prof Kanchana Trakulcoo 2) Prof Erdogen Gulari	250,000
4 Kinetic Study of Alumina Dissolution in the Synthesis of Alumatrane Polymer	1) Dr Sujitra Dhumrongvaraporn 2) Prof Richard M Laine	250,000
Total		<u>1,023,960</u>

RESEARCH GRANTS SUPPORTED BY THAI GOVERNMENT (1991-1997)

Budget (Year)	Research title	Budget (Baht)
1991	1 Synthesis of Styrenic Imbiber Beads by Suspension Polymerization	160,000 00
	2 Hydrogenation of Caster Oil using Nickel Catalyst	110 000 00
	3 Effect of Reinforced Filler on Mechanical Properties of Polyethylene Plastic	150,000 00
	Total	420,000 00
1992	1 Development of Reinforced Plastic of polyolefin with Wood Pulp Fibers as Filler	185,000 00
	2 Thermal Degeadation of Recycled Commodity Plastic Products, High Density Polyethylene, Low Density Polyethylene (LDPE), Polyvinyl Chloride (PVC)	145,000 00
	3 Effect of Epoxidized Palm oil on Mechanical Properties of PVC Plastic	207,000 00
	4 Computerised Data Bank of thermodynamic Properties of Hydrocarbons and Petrochemical	104,920 00
Total	641,920 00	
1993	1 Solid Phase Biaxial Orientation of Polyethylene Terephalate (PET)	183,900 00
	2 Synthesis of Chelating Polymer for Uses in Separation of Metal Ions from Solution	197,00 00
	3 Study of Effect of Sulfurized Palm Oil on Physical and Mechanical Properties of Lubricant oil	193,400 00
Total	574,300 00	
1994	1 A study of Foreign Residue in Pellets made From Plastic Waste	104,100 00
	2 Study of Polycyclic Aromatic Hydrocarbons in Exhaust Particulates	293,000 00
	3 Study of Corrosion Effect of Organomercury on Natural Gas Transportation Pipelines	237,900 00
	4 Study of Polycyclic Hydrocarbons in Exhaust	183 000 00
Total	818,000 00	
1995	1 Development of Froth Flotation Process for Wastewater Treatment	171 000 00
	2 Crosslinking Reaction of Polysiloxanes	193,000 00
	3 Synthesis of Liquid Crystalline, Polymer, Polysiloxanes	132,000 00
	4 Mechanical Properties and Compatibility of High Density Polyethylene (HDPE) - Poly (ethylene terephthalate) (PET)	205,400 00
Total	701,400 00	
1996	1 Kinetic Study of Silica Dissolution in the Synthesis of Silatrane Polymers	243,000 00
	2 Development of Cobalt Oxide Supported Silver Catalyst for Vehicle Exhaust Control	215 000 00
	3 Design and Test of Froth Flotation System for Wastewater Treatment	186,900 00
	4 Study of Chromium Removal from Chromium Plating Waste Using Polyelectrolyte	278,000 00
	5 Development of Ozone Oxidation Process for Wastewater Treatment	174 000 00
Total	1,096,900 00	
1997	1 Development of Pt/Sn Catalyst for Propane Dehydrogenation	298 000 00
	2 Methane Conversion to Methanol under Corona Discharge	280 000 00
	3 Study of An Application of Synthesized Ceramic/Spinel	343,000 00
	4 Synthesis and Properties of Polybenzoxazines and Study on the Application of Ion Bonding	369,000 00
Total	1,290,000 00	

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National Science and Technology Development Agency

(for chem. eng. and bio-processing eng.)

Budget Required (in Baht):

I PhD student

1 To student

Tuition – actual cost but not to exceed 100,000 -
(4 years – enrolled Institution)

Living Allowances

30-39 months in Thailand 360,000 -

9-18 months overseas – actual cost but not to exceed 630,000 -

(according to rules and regulations of Office
of the Civil Service Commission)

Transportation allowances

actual cost but not to exceed 100,000 -

2 To home supervisor

Honorarium to supplement low salary, in addition to that
received from R&D grants (for major supervisor only) 200,000 -

Travels – actual cost but not to exceed 200,000 -

(transportation allowances and per diem, 14 days/yr)

R&D grant (Special budget for R&D of this program
has been set up and proposals will be considered using
normal NSTDA granting criteria)

to be specified

3 Overseas supervisor

Travels (transportation and allowances) 150,000 -

4 Contingency 260,000 -

Total per student (PhD) 2,000,000 -

Budget per student per year 500,000 -

400 will
be funded

Thailand Research Fund

Budget for one Ph D student	=	2,000,000 Baht	
1 student living allowances in Thailand (120,000 Baht/month)	=	12,000 x 48	
	=	576,000-----	①
11 student living allowances and transportation abroad for one year	=	750,000-----	②
111 tuition and research expenses	=	70,000 x 5	
	=	350,000-----	③
1V other expenses	=	324,000-----	④



FULL-TIME FACULTY AT THE COLLEGE

NAME LIST	YEAR OF ENTERING	STATUS
<u>PETROCHEMICAL TECHNOLOGY PROGRAM</u>		
1 Mr Pomthong Malakul Na Ayuthaya	1989	Studying at University of Michigan (Expect to graduate in 1998)
2 Asst Prof Chintana Saiwan	1990	-
3 Mr Boonyarach Kitiyanan	1995	Studying at University of Oklahoma (Expect to graduate in 1999)
4 Ms Nopparat Tharapiwattananont	1995	Studying at University of Michigan (Expect to graduate in 2000)
5 Ms Apanee Luengnaruemitchai	1996	-
6 Dr Thurasak Rirksomboon	1997	-
7 Dr Sumaeth Chavadej	1997	-
8 Mr Pramoch Rungsunvigit	-	Studying at Texas A&M University (Expect to graduate in 1997)
9 Mr Piya Ourapryvan	-	Studying at University of Wisconsin (Expect to graduate in 1999)
10 Ms Sirirat Jitkarnka /	-	Studying at University of Southern California (Expect to graduate in 2000)
<u>POLYMER SCIENCE PROGRAM</u>		
1 Asst. Prof Sujtra Wongkasemjit	1989	-
2 Dr Suwabun Churachanchai	1991	-
3 Assoc Prof Kanchana Trakulcoo	1992	-
4 Ms Jantraphon Mantaseviphong	1993	-
5 Dr Nantaya Yanumet	1994	-
6 Assoc. Prof Anuvat Sirivat	1995	-
7 Dr Rathanawan Magaraphan	1996	-
8 Mr Toemsak Sriksirin	-	Studying at Case Western Reserve University (Expect to graduate in 1997)
9 Ms Hathaikarn Choosuwan	-	Will start Ph D study in 1997
<u>ASSOCIATE FACULTY</u>		
1 Prof Somchai Osuwan		
2 Assoc. Prof Shooshat Barama		
3 Assoc. Prof Kunchana Bunyakiat		
4 Dr Pornpote Piumsomboon		



Starting salary of Thai faculty members (USD / month)

	<u>normal</u>	<u>top-up</u>	<u>total</u>
<i>MS</i>	300	300	600 (15,560 Baht)
<i>PhD</i>	410	410	820 (21,200 Baht)

Other incomes based on activities

i	thesis advisor	=	1,153 (30,000 Baht/student)
ii	paper published	=	385 (10,000 Baht/paper)
iii	co-instructor	=	692 (18,000 Baht/course)
iv	instructor	=	3,461 (90,000 Baht/course)



The Petroleum and Petrochemical College
Chulalongkorn University

Teaching Schedule
Academic Year 1997
First Semester
(April to September 1997)

Course	Date	Petrochem Tech Courses	Polymer Science Courses
Intensive Course	April 17 - May 13	857501 Perspective in Petrochemical Studies*	
Course 1	May 19 - June 13	857602 Advanced Chemical Engineering Calculations <i>James O Wilkes, UM</i> (Thirasak)	858621 Advanced Polymers and Composite Materials <i>Hatsuo Ishida, CWRU</i> (Sujitra)
		857622 Process Quality Monitoring and Improvement <i>Tep Sastri, TEXAS A&M</i> (Rathanawan)	
Course 2	June 23 - July 18	857619 Colloid and Surface Science <i>John F Scamehorn, OU</i> (Sumaeth)	
		857624 Design and Management of Engineering Systems <i>Vira Chankong, CWRU</i> (Thirasak)	
	June 30 - July 25		858602 Physical Chemistry of Polymers <i>Alexander M Jamieson, CWRU</i> (Kanchana)
Course 3	July 28 - August 22	857601 Transport Phenomena <i>Edgar A O'Rear, OU</i> (Pramote)	858611 Polymer Characterization <i>Erdogan Gulari, UM</i> (Suwabun)
Course 4	September 1-26	857614 Catalysis <i>Johannes Schwank, UM</i> (Anchaleeporn)	858708 Mechanical Properties of Solid Polymers <i>Anuvat Sirivat, PPC</i>

* 1-credit course



The Petroleum and Petrochemical College
Chulalongkorn University

Teaching Schedule
Academic Year 1997
Second Semester
(April to September 1997)

Course	Date	Petrochem Courses	Polymer Courses
Course 5	October 6-31 (Petrochem) October 6-24 (Polymer)	857604 Chemical Reaction Engineering <i>Richard Mallinson, OU</i>	858620 Science and Technology of Elastomers** <i>John Ellis, PPC</i>
Course 6	November 17- December 12 (Petrochem) November 3-21 (Polymer)	857627 Natural Gas and Olefins Processing <i>Amit Chakma, REGINA and Pramote, NPC</i>	858619 Science and Technology of Fibers** <i>Nantaya, PPC</i>
Course 7	December 15-30 (Petrochem) December 1-26 (Polymer)	857625 Petrochemical Industry Technology and Economics** <i>Harold Wittcoff, CHEM SYSTEMS</i>	858604 Polymer Processing <i>Ica Manas-Zloczower, CWRU</i>
Course 8	January 12-30, 1998 (Petrochem) January 5-30, 1998 (Polymer)	857626 Energy Conservation in Industrial Processes** <i>Frank Steward, UNB</i>	

** 2-credits course



**The Petroleum and Petrochemical College
Chulalongkorn University**

**Teaching Schedule
Academic Year 1998
(April 1998 to February 1999)**

Course	Date	Petrochem Tech Courses	Polymer Science Courses
Intensive Course	April 16 - May 13	857501 Perspective in Petrochemical Studies*	
Course 1	May 18 - June 12 11 5	857602 Advanced Chemical Engineering Calculations <i>Jeffrey Harwell, OU and Pornpote, Chula</i>	858621 Advanced Polymers and Composite Materials <i>Hatsuo Ishida, CWRU + Thae, comstruclos Suwattana</i>
Course 2	June 22 - July 17 3 Rescasco	857614 Catalysis <i>Johannes Schwank, UM Lobban, OU</i>	858602 Physical Chemistry of Polymers <i>Alexander M Jamieson, CWRU</i>
Course 3	July 27 - August 21 13 July 14 Aug 7	857619 Colloid and Surface Science <i>John F Scamehorn, OU</i>	???? Inorganic Polymers <i>Richard Laine, UM</i>
Course 4	August 31 July September 25 Aug 16 - Sept 11	857604 Chemical Reaction Engineering <i>H Scott Fogler, UM</i>	???? mechanical Property of solid Polymers, Amurat.
September 26 - October 25		Semester Break	
Course 5	Sept 21 October 26 November 20 Oct 16	857603 Advanced Chemical Engineering Thermodynamics <i>James O Wilkes, UM</i>	858604 Polymer Processing <i>David Martin, UM + Kamehana</i>

* 1-credit course

7 Dec 14
Jan.

Transport
Dulari

Rich Laine
+ Sujatra

Dulari not summer
Christmas possibility, good
VI-3



Course Content Selection

Course Code	Course	Academic Year				
		1993	1994	1995	1996	1997
	Petrochemical Technology					
857601	1 Transport Phenomena		/	/		/
857602	2 Advanced Chemical Engineering Calculations	/	/	/	/	/
857603	3 Advanced Chemical Engineering Thermodynamics	/	/		/	
857604	4 Chemical Reaction Engineering	/	/	/	/	/
857614	5 Catalysis		/	/	/	/
857615	6 Natural Gas Processing	/				
857618	7 Selected Topics in Petrochemical Technology			/	/	
857619	8 Colloid and Surface Science	/		/	/	/
857621	9 Process Quality Monitoring and Improvement			/		/
857622	10 Hazardous Waste Management	/				
857624	11 Design and Management of Engineering Systems					/
857625	12 Petrochemical Industry Technology and Economics					/
857626	13 Energy Conservation in Industrial Processes					/
857627	14 Natural Gas and Olefins Processing					/
857701	15 Instrumental Analysis	/			/	
857723	16 Computer-aided Tools for Engineer and Manager				/	
858703	17 Strategies for Creative Problem Solving		/	/	/	
	Polymer Science					
858601	1 Polymer Synthesis	/	/	/		
858602	2 Physical Chemistry of Polymers	/	/		/	/
858603	3 Polymer Physics	/		/		
858604	4 Polymer Processing		/	/	/	/
858611	5 Polymer Characterization	/		/		/
858615	6 Selected Topics in Polymer Science				/	
858616	7 Inorganic and Organometallic Polymers	/				
858617	8 Introduction to Polymer Science		/	/	/	
858618	9 Biopolymers with X-Ray Crystallography		/			
858619	10 Science and Technology of Fibers					/
858620	11 Science and Technology of Elastomers					/
858621	12 Advanced Polymers and Composite Materials					/
858622	13 Thermosetting Polymers and Polymer Adhesives					/
858703	14 Strategies for Creative Problem Solving		/	/	/	
858708	15 Mechanical Properties of Solid Polymers			/	/	/
857620	16 Corrosion Engineering	/				
857621	17 Hazardous Waste Management	/				
857622	18 Process Quality Monitoring and Improvement			/		
857623	19 Computer-aided Tools for Engineers and Managers				/	
857701	20 Instrumental Analysis	/			/	



Summary of the number of theses advised by US faculty (1993 - 1996)

Program	Academic Year	CWRU	UM	OU	Total (100%)
<i>Petrochemical Technology</i>	1993	-	4 (19%)	17 (81%)	21
	1994	-	9 (50%)	9 (50%)	18
	1995	-	11 (58%)	8 (42%)	19
	1996	-	14 (54%)	12 (46%)	26
<i>Polymer Science</i>	1993	8 (44%)	10 (56%)	-	18
	1994	10 (59%)	7 (41%)	-	17
	1995	11 (65%)	6 (35%)	-	17
	1996	12 (52%)	11 (48%)	-	23
Total		41 (26%)	72 (45%)	46 (29%)	159

Participation of the US professors in teaching (1993 - 1996)

Program	Academic Year	CWRU	UM	OU	Total (100%)
<i>Petrochemical Technology</i>	1993	-	1 (20%)	4 (80%)	5
	1994	-	2 (33%)	4 (67%)	6
	1995	-	3 (60%)	2 (40%)	5
	1996	1 (17%)	3 (50%)	2 (33%)	6
	1997	-	2 (40%)	3 (60%)	5
<i>Polymer Science</i>	1993	2 (33%)	3 (50%)	1 (17%)	6
	1994	4 (80%)	1 (20%)	-	5
	1995	3 (60%)	2 (40%)	-	5
	1996	2 (50%)	2 (50%)	-	4
	1997	3 (60%)	1 (20%)	1 (20%)	5
Total		15 (29%)	20 (38%)	17 (33%)	52

US Professors (11 papers) 500\$ /paper

Paper No	1	2	3	4	5	6	7	8	9	10	11	Total (\$)
Harwell, J H	1	0 5	0 5	1			0 5					1,750
Scamehorn, J F		0 5	0 5		0 5		0 5	1				1,500
Daniels, R D					0 5							250
Gulari, E						1						500
Wang, S Q									1			500
Laine, R M										1		500
Fogler, H S											1	500
												5,500

------(1)

US Professors (36 Theses) 500\$ /Thesis

Name	No of Theses	\$
Fogler, H S	2	1,000
Gulari, E	5	2,500
Harwell, J H	2	1,000
Mallinson, R G	3	1,500
Scamehorn, J F	5	2,500
Schwank, J	3	1,500
Wilkes, J O	1	500
Hudson, S D	3	1,500
Ishida, H	3	1,500
Jamieson, A M	1	500
Laine, R M	4	2,000
Manas-Zloczower, I	2	1,000
Wang, S Q	2	1,000
Total	36	18,000

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(1) + (2) = 5,500 + 18,000 = 23,500 \$

Summary of Compensation for the year 1996

Name	Thesis (\$)	Paper (\$)	Total (\$)
Daniels, R D	-	250	250
Fogler, H S	1,000	500	1,500
Gulari, E	2,500	500	3,000
Harwell, J H	1,000	1,750	2,750
Mallinson, R G	1,500	-	1,500
Scamehorn, J F	2,500	1,500	4,000
Schwank, J	1,500	-	1,500
Wilkes, J O	500	-	500
Hudson, S D	1,500	-	1,500
Ishida, H	1,500	-	1,500
Jamieson, A M	500	-	500
Laine, R M	2,000	500	2,500
Manas-Zloczower, I	1,000	-	1,000
Wang, S Q	1,000	500	1,500
Total	18,000	5,500	23,500

Papers Published (upto May 21, 1997)

- 1 Thammanthadanukul, V , O'Haver, J H , Harwell, J H , Osuwan, S , Na-Ranong, N , and Waddell, W H , "Comparison of Rubber Reinforcement Using Various Surface-Modified Precipitated Silicas", Journal of Applied Polymer Science, 59, 1741 (1996)
- 2 Tharapiwattananon, N , Scamehorn, J F , Osuwan, S , Harwell, J H , and Haller, K J , "Surfactant Recovery from Water Using Foam Fractionation", Separation Science and Technology, 31, 1233 (1996)
- 3 Bhummasobhana, A , Scamehorn, J F , Osuwan, S , Harwell, J H , and Baramee, S , "Surfactant-Enhanced Carbon Regeneration in Liquid Phase Application", Separation Science and Technology, 31, 629 (1996)
- 4 Kittiyanan, B , O'Haver, J H , Harwell, J H , and Osuwan, S , "Adsolubilization of Isoprene and Styrene in Adsorbed Cetyltrimethylammonium Bromide Bilayers on Precipitated Silica", Langmuir, 12, 2162 (1996)
- 5 Daniels, R D , Scamehorn, J F , and Osuwan, S , "New Graduate Programs in Petrochemical Technology and in Polymer Science at Chulalongkorn University, Bangkok, Thailand - An International Academic Partnership", Proceedings of the 1996 Annual American Society of Engineering Education Meeting, Session 2260 (1996)
- 6 Srivannavit, O , Osuwan, S , and Gulari, E , "Low Temperature CO Oxidation by Cobalt Oxide Supported Silver Catalysts", Proceedings of the Fifth World Congress of Chemical Engineering, 3, 507-512 (1996)
- 7 Wungrattanasopon, P , Scamehorn, J F , Chavadej, S , Saiwan, C , and Harwell, J H , "Use of Foam Flotation to Remove Tert-Butylphenol from Water", Separation Science and Technology, 31, 1523 (1996)
- 8 Sriratana, S , Scamehorn, J F , Chavadej, S , Saiwan, C , Haller, K J , Christian, S D , and Tucker, E E , "Use of Polyelectrolyte-Enhanced Ultrafiltration to Remove Chromate from Water", Separation Science and Technology, 21, 2493 (1996)
- 9 Sirivat, A , Kanatharana, J , Sukpisarn, J and Wang, S Q , "On the Correlation between the Viscosity of Partially Hydrolyzed Polyacrylamide Solution and the Diffusion Coefficient in the Semidilute Regime", Polymer Engineering and Science, 36, No 24 (1996)
- 10 Tayaniphan, S , Dhumrongvaraporn, S , Waldner, K , and Laine, R M , "Synthesis of Spinel Precursor Directly from Al₂O₃ and Tri-Ethanolamine", Chemistry of Materials, 8, 2850-2857 (1996)
- 11 Pairat, R , Chavadej, S , Fogler, H S and Browning F H , "Precipitation and Dissolution of Calcium - ATMP Precipitates for the Inhibition of Scale Formation in Porous Media", Langmuir, 13, 1791 (1997)



*The Petroleum and Petrochemical College
Chulalongkorn University*

The Academic Calender for Second Year Graduate Students

December 27, 1996-March 12, 1997	Oral Presentation of Thesis work
March 14, 1997	Last day of submission of the draft Thesis to Thai co-advisor for correction
March 26, 1997	First Poster Presentation
April 9, 1997	Second Poster Presentation
April 11, 1997	Last day of Thesis submission to the Thesis Grading Committee
April 25, 1997	Last day for the submission of the final Thesis to the Office of Academic Affairs <i>(<u>Important</u> Students who cannot meet this deadline will not be able to graduate this Academic Year)</i>
May 2, 1997	Last day for the submission of the Advisor's Certifying Letter to the Office of Academic Affairs
May 5, 1997	Last day to apply for Graduation Commencement (A fee of Bht 500 will be charged for filing the Petition for Graduation)
Mid July 1997	Commencement day for graduates

*The Office of Academic Affairs
January 21, 1997*



Summary of the number of students
visiting the three US universities in 1997

Name of University	Number of Students
The University of Michigan	8
The University of Oklahoma	10
Case Western Reserve University	4
Total	22



LIST OF INSTRUMENTS

Polymer Testing Lab

Instruments	Model
1 Abrasion Tester	Taber 5150
2 Brittleness Temperature	Ceast 6565
3 Capillary Rheometer	Instron 4303
4 Centrifugal Ball Mill	Retsch S-1
5 Cutting Machine	Yasuda No 189
6 Environmental Stress Cracking Tester	Ceast 6095
7 Fiber/Film Shrinkage Tester	Yasuda No 435
8 Film Friction/Slip Tester	Lloyd FT01
9 Haze-Gloss Tester	BYK Gardner
10 HDT/Vicat	Ceast 6505/000
11 Insulation Tester	Yasuda No 175
12 Melt Flow Index Tester	Zwick 4105
13 Pendulum Impact	Zwick 5113
14 Plasti-Corder	Brabender(PL2000)
15 Pneumatic Punch	
16 Puncture Tester	Lloyd-LRX
17 Rockwell Hardness Tester	Matsusawa DXT
18 Salt spay tester	Elite-ST-BZ-7
19 Shore A,D Durometer	Zwick 3100
20 Sieve Shaker	Retsch-UR-1
21 Thickness gauge	Peacock-PDP1
22 Universal Testing Machine(Blockvis)	Ceast DY 30
23 Universal Testing Machine(Tensile)	Instron 4206
24 Micro Mill	MFC
25 Weatherometer	C 3000
26 Elmendorf tear Tester	Elmendorf 2000 Tear Tester



LIST OF INSTRUMENTS

Polymer Processing Lab

Instruments	Model
1 Blow Moulding	SMC 1000T
2 Blown Film Extruder	Betol 2525
3 Chill roll Cast Film	Collin T-10
4 Compression Mould (Wabash&labtech)	Wabash/Labtec
5 Grinding Machine	Pallman PSK 200
6 Injection Moulding Machine	Arbuge 270
7 Mixer	Choa Wei Inc
8 Twin Screw Extruder	Collin T-20
Instruments	Model
9 Tube&Profile Extruder	Collin
10 Two Roll Mills	Lab Tech LRM 110
11 Pad Printer	PP-21

Environmental Lab

Instruments	Model
1 Total Organic Carbon Analyzer (TOC)	Shimadzu TOC 5000
2 COD Analyzer	Tecator
3 Rapid BOD Analyzer	Nissin Electric
4 Manometric BOD Analyzer	BOD VELP
5 Dissolved Oxygen Meter	Orion 860
6 Turbidimeter	Jenway 6035
7 BOD Incubator	Velp 225D
8 Zeta Potential Meter	Zeta 3 0
9 pH Meter	Jenway
10 Oven	Memmert
11 Furnace	Platon
12 Ion-Selective Meter	Orion
13 Autoclave	Jouan
14 Incubator	VELP 225d
15 Nitrogen Compound Analyzer	San
16 Oil Content Analyzer	Hornba-Ocma 300
*17 Mercury Analyzer	



LIST OF INSTRUMENTS

Petroleum Lab

Instruments	Model
1 Bomb Calorimeter	GallenKamp CBA350K
2 Cloud and Pour Point Tester	Stanhope 11010-0
3 Cu/Ag Corrosion Bath	Stanhope 114000-3
4 Distillation Apparatus	Stanhope 11860-2
5 Elemental Analyzer	Perkin Elmer 2400
6 Flash and Fire Point Tester	Gallenkamp AF3
7 Freezing Point Apparatus	Stanhope 16990-0
8 Junkers Calorimeter	
9 Kinematic Viscosity	Stanhope 83541-3
10 Ramsbottom Test Bath	Stanhope 10900-0
11 Smoke Point Apparatus	Stanhope 11400-0
12 Twin Column Adsorption Apparatus	Stanhope 14060-0
13 Combustion Exhaust Analyzer	
14 Universal Penetrometer with Setamatic Controller	Stanhope 17000-0



LIST OF INSTRUMENTS

Physico-measurement Lab

Instruments	Model
1 Particle size Analyzer	Malvern MSX 03SM
2 Chemisorb (Quantachrome)	Quantachrome
3 Surface Area Analyzer	Quantachrome
4 Tensiometer	Kruss K 10ST
5 Differential Scanning Calorimeter-DSC 200	Netzsch DSC 200
6 Thermogravimetric Analyzer-TG209	Netzsch TG-209
7 Simultaneous Thermal Analysis-STA409	Netzsch 409
8 Differential Scanning Calorimeter-DSC-910S	TA Instrument 910S
9 Thermogravimetric Analyzer-TGA-2950	Du Pont 2950
10 Scanning Electron Microscope	JEOL 5200
11 Zoom Stereo Microscope	OlympusSZ-4045-TR
12 Dead-Weight Tester	Bergdenber
13 TPD/TPR ANALYSER	290
14 Spinning Drop Tensiometer	KRUSS
15 Gas Flowrate Calibrator	CAL-BENCH Series 100
16 Polarizing Microscope	DM RXP (T/R)
17 Microtomb	RM 2155
*18 Scanning Probe Microscope	-
*19 Differential Scanning Colorimeter	



LIST OF INSTRUMENTS

Analytical Lab

Instruments	Model
1 Atomic Absorption Spectrophotometer (AAS)	Variance 300
2 FT-IR Spectrophotometer	Bio-rad FTS-45A
3 GC/FT-IR	Bio-rad GC/C32
4 Gel Permeation Chromatography (GPC high)	150C+
5 High Pressure Liquid Chromatography (HPLC)	- Hewlett HP 1050 - Perkin Elmer 200 LC
6 Ion Chromatography (IC)	Hewlett HP 1050
7 GC/MS Autospec	Fison
8 GC/MS Quadrupole	Fison MD800
9 GC - Hewlett Packard 10 - Perkin Elmer 11 - Fison 12 - Shimadzu	- HP 5890 - Auto system - Fison 8340 - GC 14A
13 Microwave Sample Preparation	MDS 2000
14 KF-Titrator	720 KFS
15 FT-IR Microscope	IR MICROSCOPE
16 XRD	D-MAX2200H
17 FT-Raman Spectroscopy	FRA 106
18 Gel Permeation Chromatography (GPC)	Water 600E
19 UV-VIS Spectrophotometer & Color Matching Equipment	Perkin Elmer Lambda -16

Research Lab

1 Spectrophotometer	CE II2040
2 CO/CO ₂ Gas Analyzer	Anarad 80
3 Ozone Generator	- VTU OG 20 - Orec V10-AR
4 Pilot Scale Distillation Unit	Corbond BS 5500
5 Parr Reactor	Parr Reactor
6 Spray Dryer	Buchi B-191

Journals Subscription for 1997		
Library and Information Center, The Petroleum and Petrochemical College		
No	Title	Remarks
1 ★	Annual Review of Materials Science	
2 ★	Annual Review of Physical Chemistry	
3	Applied Spectroscopy	
4 ★	Asian Chemical News	
5 ★	Byte (Thai)	
6 ★	Chemical Fibers International	
7	Colloids and Surface Part A & Part B	
8 ★	Computer Today (Thai)	
9	Environmental Science and Technology	
10	International Polymer Processing	
11 ★	Internet Today (Thai)	
12	Journal of Catalysis	
13	Journal of Macromolecular Science Part B Physics	
14	Journal of Polymer Engineering	
15	Journal of Polymer Science Part A & Part B	
16	Langmuir	
17	Macromolecules	
18	Modern Plastics International	
19 ★	NewsWeek	
20	Oil & Gas Journal	
21	Plastics Engineering	
22	Rubber Chemistry and Technology	
23 ★	Scientific American	
24	Separation Science and Technology	
25	Trends in Polymer Science	

★ New Journals (9 Items)

Journals Subscription for 1997**Library and Information Center, The Petroleum and Petrochemical College****Donated Journal (From Instructors at College)**

- 1 AICHE (1996-)
- 2 Chemical Engineering Progress (1996-)
- 3 Journal of the Science Society of Thailand (1995-)
- 4 Materials World (1993-)
- 5 Science (1995-)

Donated Journal (From Prof R M Laine - University of Michigan)

- 1 Journal of the Electrochemical Society (1958- 1992)



**GPA Range of Students at Bachelor Degree Level
Class I - Class V (93xxxx - 97xxxx)**

Petrochemical Technology Program

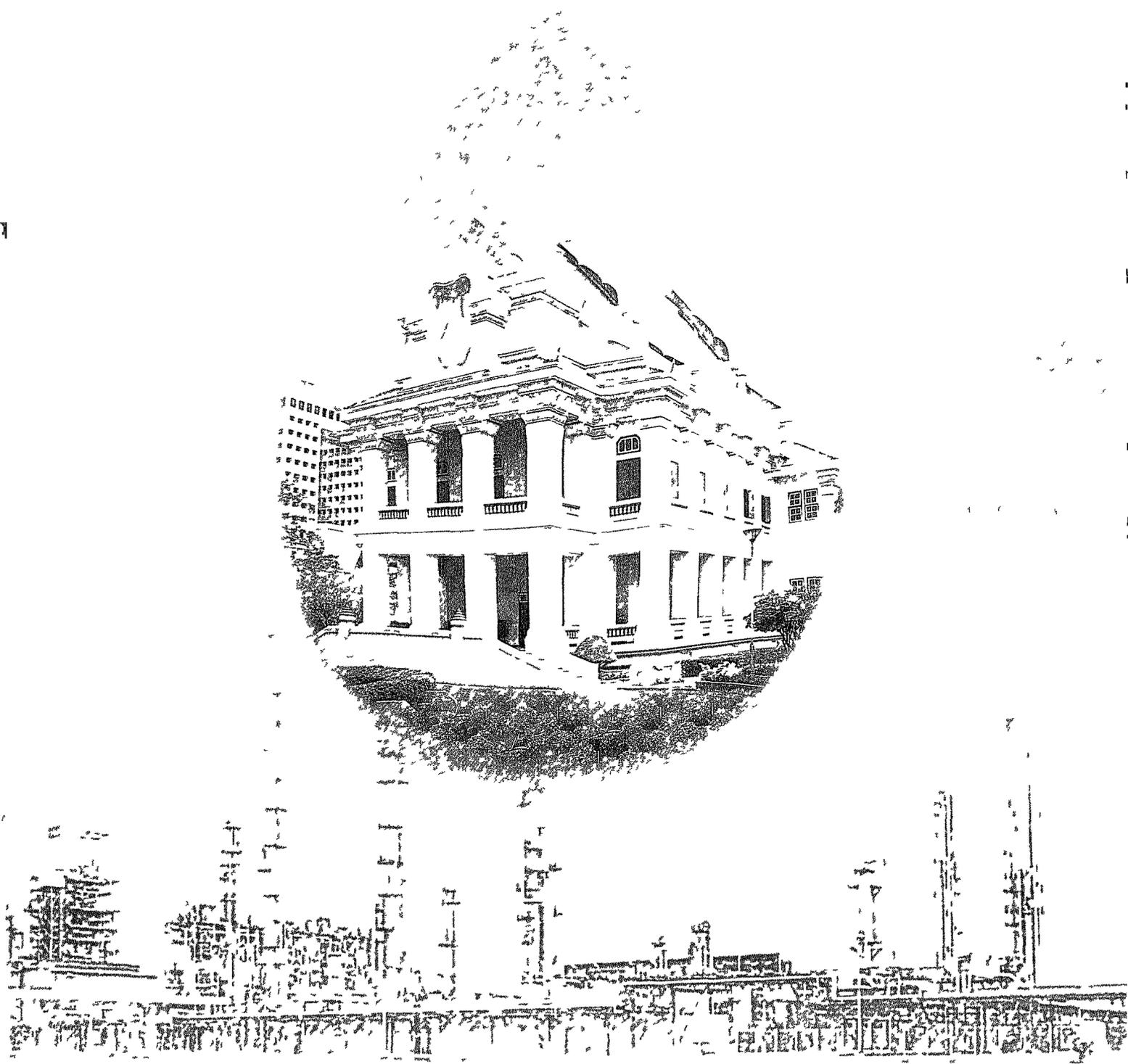
GPA Range	Class I (93xxxx)	Class II (94xxxx)	Class III (95xxxx)	Class IV (96xxxx)	Class V (97xxxx)
Over 3.50	5 (24%)	2 (11%)	3 (16%)	-	3 (10%)
3.49 - 3.25	5 (24%)	2 (11%)	3 (16%)	8 (31%)	4 (14%)
3.24 - 3.00	3 (14%)	7 (39%)	3 (16%)	6 (23%)	9 (31%)
2.99 - 2.75	5 (24%)	6 (33%)	4 (21%)	3 (11.5%)	4 (14%)
2.74 - 2.50	-	-	4 (21%)	3 (11.5%)	4 (14%)
Less than 2.50	3 (14%)	-	2 (10%)	6 (23%)	3 (10%)
Different Evaluation System	-	1 (6%)	-	-	2 (7%)
Number of Students	21	18	19	26	29
Average GPA	3.17	3.17	3	2.88	3.01

Polymer Science Program

GPA Range	Class I (93xxxx)	Class II (94xxxx)	Class III (95xxxx)	Class IV (96xxxx)	Class V (97xxxx)
Over 3.50	1 (5.5%)	-	1 (6%)	4 (17%)	2 (7%)
3.49 - 3.25	4 (22%)	5 (29%)	6 (35%)	9 (37.5%)	6 (22%)
3.24 - 3.00	3 (17%)	4 (23.5%)	2 (12%)	2 (8%)	5 (18.5%)
2.99 - 2.75	8 (44.5%)	4 (23.5%)	4 (23%)	4 (17%)	8 (30%)
2.74 - 2.50	1 (5.5%)	3 (18%)	2 (12%)	3 (12.5%)	5 (18.5%)
Less than 2.50	1 (5.5%)	1 (6%)	1 (6%)	2 (8%)	-
Different Evaluation System	-	-	1 (6%)	-	1 (4%)
Number of Students	18	17	17	24	27
Average GPA	3.00	3.22	3.06	3.09	3.03



The Petroleum and Petrochemical College Chulalongkorn University



ACTIVITY REPORTS 1995-1997

Activity Report: 1995-1997



The Petroleum and Petrochemical College Chulalongkorn University Bangkok, Thailand

In academic partnership with

*Case Western Reserve University
The University of Michigan
The University of Oklahoma*



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Report from the Director

In July 1995 the Petroleum and Petrochemical College celebrated the graduation of the first class of students from its International Master Degree programs. Since then the College has not only consolidated the foundation that has been laid in the first few years but has also made important progresses. The period between 1995-1997 has therefore been a period of steady growth with inroads into many new areas.

Two more classes of students graduated in 1996 and 1997 with 35 and 36 students respectively bringing the total number of graduates to 110 for the first three classes. All of these students were able to graduate within the period of 2 years and had no difficulty in getting employment after their graduation. Most of them are now working in the industry contributing to its advancement. The number of student enrollment has increased sharply in the last 2 years with 49 in the fourth class and 52 in the present fifth class while the average GPA of the new students remains high at above 3.0.

The Master Degree programs at the College attach great importance to the quality of students' research work with emphasis on publishable results. This is evident in the number of papers which have already appeared in leading international journals since late 1995. Of the 39 theses completed by the first class of graduates, 21 papers have been published or submitted for publications while 19 presentations have been made at international conferences. This is indeed a remarkable achievement and we have no doubt that the work of the latter classes of students will continue to maintain this high standard set by the first class.

The year 1997 also sees the start of the International Doctor of Philosophy programs at the College. There are presently 4 Ph.D. students, 2 in each of the Petrochemical Technology and Polymer Science programs, and the enrollment number is expected to increase by 2 in each subsequent year up to a maximum of 8 in each program.

Another significant growth area is in the acquisition of research grants which have grown steadily from just over 500,000 baht in 1993 to over 10 million baht in 1997 with increasing contributions from industry. This will help to maintain the high standard of research conducted at the College and to ensure the sustainability of the programs.

There has also been a steady increase in the number of full-time faculty members at the College from only 5 in 1993 to the present 12 with 3 more expected to join by the end of 1997. Five other members are on study leave and are expected to complete their studies over the next 3 years, bringing the total number of faculty members to 20 by the year 2000. To help recruit and maintain highly qualified faculty, the College has introduced a top-up scheme to supplement the basic salary for all of its faculty and staff members. This enables them to dedicate all of their time to the College and creates a more enthusiastic and efficient working atmosphere.

The international academic partnership with the three U.S. universities is now in its fifth year. During this time 22 U.S. professors from the three partner universities have conducted lecture courses at the College with more still to come. The College continues to receive strong support from the three partner universities and at the last Annual Steering Committee Meeting, held in June 1997, the four participating universities agreed to extend the original agreement for a further 5-year period. Thus we can look forward to closer collaborations and greater achievements as we move into the second phase of our partnership.

The College has come a long way since the inauguration of its international programs in 1993. It has established a model for the running of a successful graduate program of high international standard, a model which is being used by other newly created programs. We are confident that with the solid foundation that we have built and the sustainability of the programs assured, the College will be able to move on to new challenges and become a regional center of excellence in petrochemical technology and polymer science in the near future.



Professor Somchai Osuwan
Director The Petroleum and
Petrochemical College

Administration and Organization

The Petroleum and Petrochemical College is one of the graduate schools in Chulalongkorn University which have their own governing body with a certain amount of autonomy. This has enabled the College to overcome some of the limitations of the traditional government system and to operate more independently while remaining a government institution. In the case of the College, its governing body consists of a Governing Board chaired by the President of the University and an Executive Board chaired by the Director of the College. Members of the two boards are selected from heads of relevant departments within the University, representatives from outside related organizations and high ranking representatives from industry. The governing board meets 1 to 2 times a year while the executive board meets once every 2 months. There is also a bi weekly meeting of the Academic Committee comprising all faculty and other senior staff members to discuss College day to day matters. The College receives regular annual budget support from the government. The extra expenditure arising from the international programs is covered by income from student fees, industrial service charges, short course fees, research grants, and donations.

The College's administration consists of three main departments to oversee the administration, academic and research affairs. Each department is under the supervision of a deputy director and is headed by a permanent staff. The College now has 12 full time faculty members, 36 administrative and technical staff, and 2 expatriates who work as technical specialists.

The College occupies eight floors of a 14 story building located in the north corner of the university campus. Its total floor area is 7,000 square meters which is divided into 6 laboratories, a library, a computer center, a 120 seat auditorium, classrooms, faculty and administrative offices, and study rooms for students. The College was fortunate to receive a grant of 160 million baht (US\$ 6.2 million) from the Thai government for the acquisition of equipment at the start of its International Master Degree programs in 1993, to be spent over a period of 5 years. With all the expenditures completed in 1997 the College's laboratories are now among the best equipped in Thailand. The College continues to receive funds for the purchase of new equipment and its maintenance both from the government and outside sources. This will ensure that its laboratories remain to be the best in the country with continued upgrading and expansion.



The Governing Board

Chairman

Professor Thienchay Kiranandana
President, Chulalongkorn University

Board Members

Professor Sippanondha Ketudat
Chairman, National Economic and Social Development Board

Professor Prasom Sthapitanonda
Professor Emeritus, Chulalongkorn University

Associate Professor Kamchad Mongkolkul
Board Member of Chulalongkorn University Council

Mr Sivavong Changkasri
Chairman, Petroleum Authority of Thailand

Professor Yongyuth Yuthavong
Director, National Science and Technology Development Agency

Dr Chokchai Aksaranan
Chairman, The Federation of Thai Industries

Mr Chote Sophonpanich
Chairman, Eternal Petrochemical Co , Ltd

Mr Narong Chokwatana
Chairman, PAN Group

Mr Yiem Chundprasit
Deputy Managing Director, Thai Oil Co , Ltd

Professor Kua Wongboonsin
Vice President for Administration, Chulalongkorn University

Professor Somsak Panyakeow
Vice President for Science and Technology Development Affairs,
Chulalongkorn University

Associate Professor Narong Yoothanom
Dean, Faculty of Engineering, Chulalongkorn University

Professor Sakda Siripant
Dean, Faculty of Science, Chulalongkorn University

Associate Professor Weresak Udomkichdecha
Director, Metallurgy and Materials Science Research Institute,
Chulalongkorn University

Associate Professor Culthorn Silapabanleng
Director, Energy Research Institute, Chulalongkorn University

Associate Professor Wasant Pongsapich
Director, Institute of Environmental Research, Chulalongkorn University

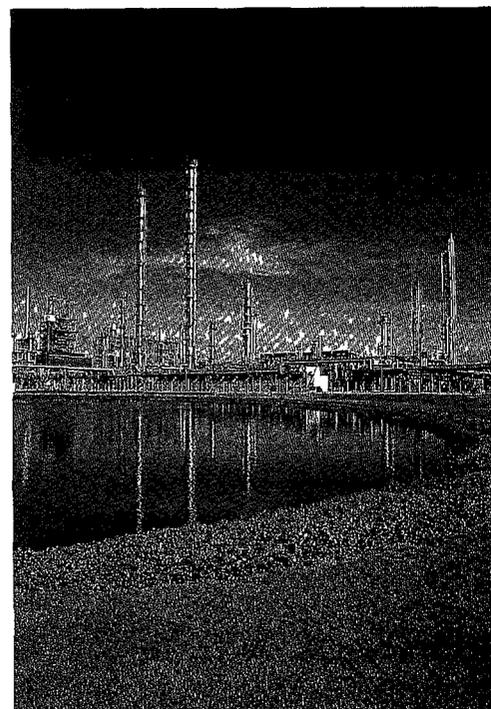
Board Member and Secretary

Professor Somchai Osuwan
Director, The Petroleum and Petrochemical College

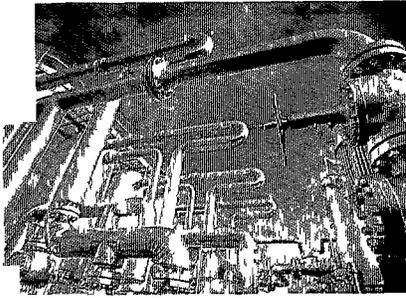
Board Members and Assistant Secretaries

Associate Professor Shooshat Baramé
Deputy Director for Administrative Affairs,
The Petroleum and Petrochemical College

Dr Sumaeth Chavadej or Dr Nantaya Yanumet
Deputy Director, The Petroleum and Petrochemical College



The Executive Board



Advisory Members

Professor Prasom Sthapitanonda
Professor Emeritus, Chulalongkorn University

Professor Padet Sidisunthorn
Professor Emeritus Chulalongkorn University

Professor Pramote Chaiyavech
National Petrochemical Public Co. Ltd

Associate Professor Kamchad Mongkolkul
Board Member of Chulalongkorn University Council

Associate Professor Salag Dhabanandana
President, Intellectual Property Institute,
Chulalongkorn University

Chairman

Professor Somchai Osuwan
Director, The Petroleum and Petrochemical College

Board Members

Associate Professor Shooshat Baramé
Deputy Director for Administrative Affairs,
The Petroleum and Petrochemical College

Dr Sumaeth Chavadej
Deputy Director for Research Affairs,
The Petroleum and Petrochemical College

Dr Nantaya Yanumet
Deputy Director for Academic Affairs
The Petroleum and Petrochemical College

Ms Varaporn Kajornchaiyakul
Director, Rubber Based Industry Research and Development Center,
Rubber Research Institute of Thailand

Mr Ieum Ieumwananonthachai
Executive Director, Nitro Chemical Industry Co., Ltd

Associate Professor Kroekchai Sukanjanajtee
Department of Chemical Engineering, Chulalongkorn University

Associate Professor Supawan Tantayanon
Department of Chemistry, Chulalongkorn University

Associate Professor Anuvat Sirivat
The Petroleum and Petrochemical College, Chulalongkorn University

Assistant Professor Khemchai Hemachandra
Chairman, Department of Materials Science,
Chulalongkorn University

Board Member and Secretary

Associate Professor Kunchana Bunyakit
Department of Chemical Technology, Chulalongkorn University

Assistant Secretary

Ms Suvatcharee Intravichitr
Secretary to the Administrative Office,
The Petroleum and Petrochemical College

International Academic Partnership

In 1992 Chulalongkorn University entered into an academic partnership with three U S universities, Case Western Reserve University, the University of Michigan, and the University of Oklahoma, to develop and offer graduate programs at the master degree level in Petrochemical Technology and Polymer Science. The participating partners are the Petroleum and Petrochemical College of Chulalongkorn University, the Department of Macromolecular Science of Case Western Reserve University, the Department of Chemical Engineering of the University of Michigan, and the School of Chemical Engineering and Materials Science of the University of Oklahoma. The aim was to produce graduates of high international standard and to develop world class research programs at the College. The academic partnership is managed by a four member Steering Committee comprising the Director of the Petroleum and Petrochemical College and representatives from the three U S Universities. The Committee which meets annually is responsible for academic program planning including setting course and thesis requirements, course selection, and assignment of U S instructors. In recognition of the U S university participation the degree diplomas of graduates of the Petroleum and Petrochemical College are countersigned by the academic department heads of the three U S partner universities.

Under the partnership about 8 to 10 U S faculty members from the three U S universities come to teach at the College each year. Courses offered by U S faculty members are equivalent to those offered in graduate programs on their respective home campuses, having the same content, rigor and expectations. U S faculty that participate in the program as instructors are expected to work with Thai counterpart faculty and 3 to 5 graduate students in order to identify and initiate research projects. The students are jointly supervised by the U S and Thai faculty members. Over the past four and a half years 22 U S faculty have come to teach at the College offering as many as 20 different courses in the two academic programs. The partnership also provides for the students to carry out part of their thesis work at U S universities and this has been one of the most valuable and enriching experiences that students gain from attending the programs.

The partnership is now in its fifth year and it has proved to be the most successful joint venture. This was evident in an interview given to Radio Thailand on July 14, 1995 by representatives of the three U S universities at the celebration of the first class of graduates from the programs. Professor Johannes Schwank, Chairman of Chemical Engineering Department of the University of Michigan had this to say *"When this program started, it was certainly a bold vision. And it took the dedicated effort of many people both at Chulalongkorn University and the three partner universities, and the foresight and the assistance of the USAID program, to make this program a reality. We can now look back on a very rapid and remarkably efficient development of the program."*

Professor Jeffrey Harwell, Director of the School of Chemical Engineering and Materials Science of the University of Oklahoma said *"We made the commitment with the Thai faculty of Chulalongkorn University to pursue the same level and quality of research for the students here at Chulalongkorn University as we have in Oklahoma, Michigan and Case. I am very happy to say that we have been able to achieve this in just a short time."* The same impression was expressed by Professor Hatsuo Ishida of Case Western Reserve University who said *"This College has achieved a tremendous milestone in just a few short years where others spent 30 years to achieve. We are trying to develop an infrastructure of research, building, instruments, and moreover, human resources and that is a very difficult thing to achieve in a short time. This College has done a quite difficult task in such a short time."*

With the success of the first five years the partnership has grown ever stronger and at the latest Annual Steering Committee Meeting held in June 1997 the four partner universities have agreed to extend the partnership for a further 5 year period and to extend the collaboration to cover the newly introduced Ph D programs as well.



Faculty members from the four partner universities

Profiles of the Four Partner Institutions



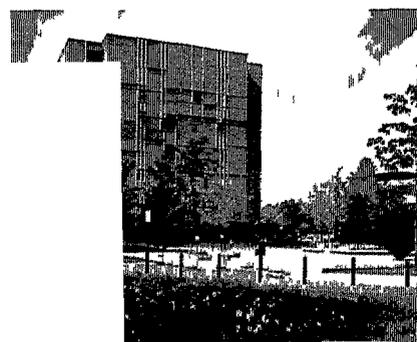
The Petroleum and Petrochemical College Chulalongkorn University

Chulalongkorn University was founded in 1916 being the first university in Thailand. Since that time the University has grown steadily and remains the country's most prestigious university. Today it has seventeen faculties, two graduate schools, two colleges, twelve research institutes, two centers, and three affiliated institutions. University graduates number about 6,000 students each year with degrees ranging from bachelor to doctorate. The University set up the Petroleum and Petrochemical College in 1988 in anticipation of the need for highly qualified manpower in the newly established and fast growing petroleum and petrochemical industries. The new College aimed to develop into a center of excellence in petrochemical technology and polymer science. To achieve this aim the College entered into an academic partnership with three leading U.S. universities and began offering international graduate programs in 1993. Today the College has become the largest and best equipped graduate school in its fields.



The Department of Macromolecular Science Case Western Reserve University

Case Western Reserve University in the State of Ohio is a leading independent research oriented university in the U.S. Its Department of Macromolecular Science was the first dedicated polymer research organization in the U.S. The Department now graduates about 15 M.S. and 10 Ph.D. students each year. The success of its research programs is shown by the amount of research support to the Department which reached US\$ 5 million during 1995-1996. The Department is now the homebase for five major research centers with specialized interests including liquid crystalline polymers, composite materials, and other advanced polymers. The Department's participation in the partnership concentrates mainly in the Polymer Science program.



The Department of Chemical Engineering The University of Michigan

The University of Michigan ranks among the leading universities in the U.S. It is situated in the university town of Ann Arbor, Michigan. Its Department of Chemical Engineering is ranked as one of the top engineering schools in the world. The Department has very diverse research interests covering such areas as biotechnology, materials and polymer processing, environment, transport phenomena, catalysis, and microelectronics. These research activities are supported by the best facilities available with continued funding from various sources. With expertise in both engineering and materials science the Department's participation in the partnership extends to both the Petrochemical Technology and Polymer Science programs with the participation of a few faculty members from the closely related Department of Materials Science and Engineering at the University.

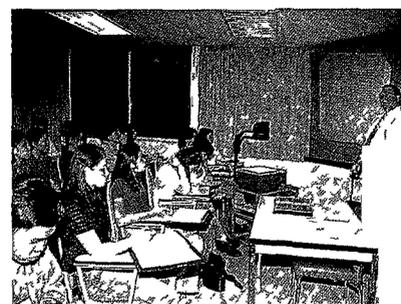
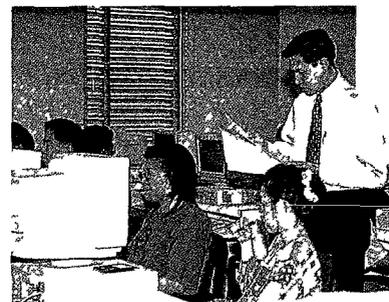


The School of Chemical Engineering and Materials Science The University of Oklahoma

The University of Oklahoma, founded in 1890, is one of the major public universities in the U.S. It is situated in the town of Norman, Oklahoma. Its School of Chemical Engineering and Materials Science is ranked in the top 10 Chemical Engineering departments in the U.S. in terms of research expenditure for 1995-6. Its research activities focus on four major application areas: bioengineering, energy and chemicals, environmental engineering, and polymer science and engineering. A full range of highly sophisticated equipment is available in each area. Within the School are three research institutes, the Institute for Applied Surfactant Research, the Center for Natural Gas Research, and the Center for Polymer and Fiber Research. The School is participating in both the Petrochemical Technology and Polymer Science programs at the College.

Academic Programs

The academic programs at the Petroleum and Petrochemical College consist only of graduate studies with Master of Science (M S) and Doctor of Philosophy (Ph D) programs in two areas Petrochemical Technology and Polymer Science The M S programs require a minimum of 2 years while the Ph D programs range from 3 to 5 years depending on the student's qualifications All of the programs are combinations of course work and a thesis or dissertation with special emphasis on high quality research work The curriculum content and thesis requirements are typical of those required in similar graduate programs at major U S universities The M S students normally spend the first year doing course work and the rest of the time on theses while the Ph D students need an additional semester to complete their course work The courses offered consist of a number of core courses and numerous elective courses Students must take at least three core courses together with other elective courses to obtain the required number of credits Courses are taught in four week modules with the students taking only one course at a time There is normally a one week break between courses The programs are conducted entirely in English with the majority of courses being taught by U S professors from the three partner universities The U S professors also work with the Thai faculty in identifying and initiating research topics and coadvising the students Students in the programs generally have the opportunity to work with their professors in the U S for a period of time in order to complete their theses As a requirement for graduation, students must obtain a GPA of not less than 3.0 in their course work and complete a high quality thesis with potentially publishable results Students must also give oral and poster presentations of their thesis work as part of the requirements for graduation



International Master of Science and Doctor of Philosophy Degrees

Structure of the M S Programs

The M S programs are offered in two areas Petrochemical Technology and Polymer Science The two year Master's program is a full time program divided into two academic semesters The first semester of four month duration runs from late May to September, and the second semester of four months from November to February Students may spend the three summer months (March May) for industrial training or for carrying out research work It is also possible for some students to carry out research work in one of the collaborating U S universities

Before starting the program students are required to take a one credit Intensive Course This four week course is designed to review the basic concepts of chemistry and chemical engineering, to give an overview of the petrochemical and polymer industries and to enhance solid competency in computers The course also develops skills in English and library information seeking abilities

The M S program requires at least 36 credits 24 credits of course work and 12 credits of thesis research The 24 credits consist of at least nine credits of core courses, 13 credits of electives, a one credit Seminar course, and a one credit Intensive course

Structure of the Ph D Programs

The Ph D programs are also offered in two areas Petrochemical Technology and Polymer Science The Ph D degree requires a minimum of 60 credits beyond the M S degree 12 credits of course work and 48 credits of thesis research The program requires that the student passes both a qualifying examination and a research examination on his/her dissertation proposal

Students can be admitted directly to the Ph D programs from a B S degree In this case, they are required to obtain a total of 84 credits 36 credits of course work and 48 credits of thesis work

Courses in Petrochemical Technology Program

The Petrochemical Technology program is basically a Chemical Engineering program with special emphasis on appropriate choices of courses and research projects. It is common practice in U.S. universities to offer the M.S. degree even in Engineering colleges.

Core Courses

857601	Transport Phenomena	(3)
857602	Advanced Chemical Engineering Calculations	(3)
857603	Advanced Chemical Engineering Thermodynamics	(3)
857604	Chemical Reaction Engineering	(3)

Elective Courses

857611	Process Simulation and Design	(3)
857612	Process Control	(3)
857613	Advanced Equilibrium Stage Operations	(3)
857614	Catalysis	(3)
857615	Natural Gas Processing	(3)
857616	Engineering Management	(3)
857617	Pollution Control	(3)
858618	Selected Topics in Petrochemical Technology	(3)
857619	Colloid and Surface Science	(3)
857620	Corrosion Engineering	(3)
857621	Hazardous Waste Management	(3)
857622	Process Quality Monitoring and Improvement	(3)
857623	Computer aided Tools for System Analysis	(3)
857624	Design and Management of Engineering Systems	(3)
857625	Petrochemical Industry Technology and Economics	(2)
857626	Energy Conservation in Industrial Processes	(2)
857627	Natural Gas and Upstream Petrochemicals Processing	(3)
857703	Introduction to Instrumental Analysis	(1)
857704	Non Newtonian Fluid Behavior	(3)
857705	Advanced Combustion Process	(3)
857706	Advanced Radiative Heat Transfer	(3)

Other courses offered in the Polymer Science program

Thesis

857801	Thesis	(12)
857828	Doctoral Dissertation	(48)

Courses in Polymer Science Program

While several overlaps exist between the two programs, Polymer Science students study essentially a totally different set of subjects for most of their study.

Core Courses

858601	Polymer Synthesis	(3)
858602	Physical Chemistry of Polymers	(3)
858603	Polymer Physics	(3)
858604	Polymer Processing	(3)

Elective Courses

858611	Polymer Characterization	(3)
858612	Rheological Properties of Polymers	(3)
858613	Composite Materials	(3)
858614	Biomaterials	(3)
858615	Selected Topics in Polymer Science	(3)
858616	Inorganic and Organometallic Polymers	(3)
858617	Introduction to Polymer Science	(3)
858618	Biopolymers	(3)
858619	Science and Technology of Fibers	(2)
858620	Science and Technology of Elastomers	(2)
858621	Advanced Polymers and Composite Materials	(3)
858703	Strategies for Creative Problem Solving	(1)
858706	Advanced Polymer Physics	(3)
858707	Polymer Dynamics and Light Scattering	(3)
858708	Mechanical Properties of Solid Polymers	(3)

Other courses offered in the Petrochemical Technology program

Thesis

858801	Thesis	(12)
858828	Doctoral Dissertation	(48)



Faculty

The College has at present 12 full time faculty members with 3 more expected to join by the end of the year while 5 are on study leave abroad. At the moment most of the courses in the international programs at the College are taught by faculty from the 3 U S universities while the Thai faculty assist the U S professors in students' course work as co instructors and co advise students' theses. A few Thai faculty also teach courses themselves and it is expected that more Thai faculty will participate in the teaching in the future. The U S faculty from the 3 U S universities are highly qualified academicians, most have attained full professorship and are highly recognized for their contributions to research in their specialties. All heads of the participating departments have also taught and/or coadvised students' theses at the College. Over 20 U S professors have come to teach at the College and more are expected to join in the future. The College also has a number of associate faculty from local institutions and visiting faculty from overseas to teach special elective courses which helps to widen the scope of course contents in its academic programs.

Full-Time Faculty

Somchai Osuwan

Professor of Chemical Engineering
B Sc (Hons)(Chula), M Sc Ph D (New Brunswick)
Research interests

- Energy, fuel and combustion
- High temperature heat transfer
- Chemical kinetics and catalysis
- Surfactant application and separation processes



Somchai Osuwan

Shooshat Baramé

Associate Professor of Chemical Engineering
B Sc (Hons)(Chula) D E A , Docteur Ingenieur(Toulouse)
Research interests

- Extraction
- Gasification
- Rubber technology
- Energy conservation



Shooshat Baramé

Kanchana Trakulcoo

Associate Professor of Chemical Engineering
B Sc (Hons) M Sc (Chula) M S (Ohio State), D Eng (Cleveland)
Research interests

- Polymer processing technology
- Polymer compounds and polymer composites
- High temperature ceramic materials, electrodeposition



Kanchana Trakulcoo

Sumaeth Chavadej

B Sc (Chula), M S (Newcastle Upon Tyne) Ph D (Monash)
Research interests

- Surfactant and catalyst for environmental control
- Filtration
- Electrochemical processes
- Anaerobic treatment



Sumaeth Chavadej

Anuvat Srivat

Associate Professor of Polymer Physics and Engineering
B Sc , M Eng , Ph D (Cornell)
Research interests

- Polymer dynamics and molecular model
- Viscoelasticity of solid polymers and polymeric liquids
- Light scattering and laser spectroscopy
- Turbulence and stability in fluid



Anuvat Srivat



Nantaya Yanumet

Nantaya Yanumet

B Sc (Hons), Ph D (Manchester)

Research interests

- Application of synthetic fibers in textiles and composite materials
- Development of high performance fibers for textile and industrial usage



Chintana Saiwan

Chintana Saiwan

Assistant Professor of Petrochemistry

B Sc (Kasetsart), Ph D (Missouri)

Research interests

- Fundamentals and applied aspects of surfactant
- Environmental aspects (such as air pollution waste treatment)
- Spectroscopic and chromatographic technique
- Application of polyelectrolyte for heavy metal removal



Sujitra Wongkasemjit

Sujitra Wongkasemjit

Assistant Professor of Polymer Science

B Sc (Chula), M S (Rochester Inst of Tech) Ph D (West Virginia)

Research interests

- Synthesis and application of inorganic/organometallic polymer
- Polymer precursor to spinel directly from alumina



Suwabun Chirachanchai

Suwabun Chirachanchai

B Eng, M Eng Ph D (Osaka)

Research interests

- Synthesis and application of functional polymer polymer membrane
- Biopolymer
- Inclusion compound



Rathanawan Magaraphan

Rathanawan Magaraphan

B Sc (Chula), M Sc Ph D (Akron)

Research interests

- Adhesion and failure mechanism
- Mechanical and viscoelastic properties
- Polymer rheology
- Polymer processing and characterization



Thirasak Rirksomboon

Thirasak Rirksomboon

B Sc M Sc (Chula) Ph D (New Brunswick)

Research interests

- Boiling liquid expanding vapor explosion (BLEVE)
- Combustion
- Chemical reaction engineering



Jantraphon Mantaseviphong

Jantraphon Mantaseviphong

B Sc (Kasetsart), M S (Akron)

Research interests

- Properties of polymers
- Polymer recycling

Pomthong Malakul Na Ayudhaya

(On leave for Ph D study at University of Michigan)

B Eng (Hons)(KMITT), M App Sc (New South Wales)

Research interests

- Biochemical technology
- Liquid waste treatment

Boonyarach Kitiyanan

(On leave for Ph D study at University of Oklahoma)

B Sc (Hons) M S (Chula)

Research interests

- Surface and colloid science
- Applied surfactant technology

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Nopparat Tharapiwattananon

(On leave for Ph D study at University of Michigan)

B Sc (Hons), M S (Chula)

Research interests

Applied surfactant technology
Catalysis



Apanee Luengnaruemitchai

Apanee Luengnaruemitchai

(On leave for Ph D study at the Petroleum and Petrochemical College)

B Sc (Prince of Songkla), M Sc (Chula)

Research interests

Energy and combustion
Rubber technology



John W Ellis

John W Ellis

FI M , M Sc (Loughborough University of Tech), Cert Ed

Polymer testing and processing expert

Bernd Udo Jacob

Integrated polymer expert



Bernd Udo Jacob

Associate Faculty**Pramote Chaiyavech**

Professor of Chemical Engineering

B Sc (Hons)(Chula), Ph D (Austin)

National Petrochemical Public Co , Ltd

Kunchana Bunyakiat

Associate Professor of Chemical Engineering

B Sc (Hons)(Chula), M S (Saskatchewan), Post Grad Dip (Leeds)

Department of Chemical Technology, Chulalongkorn University

Pornpote Piumsomboon

B Sc (Chula), Ph D (New Brunswick)

Department of Chemical Technology, Chulalongkorn University

Anchaleeporn Waritswat

B Sc (Chula) D Eng (Kyoto)

Department of Chemical Engineering, Faculty of Engineering,
King Mongkut's Institute of Technology (Ladkrabang)

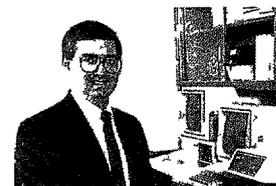
Participating U S Faculty**The University of Oklahoma****Jeffrey H Harwell**

Professor and Director, School of Chemical Engineering and Materials Science

B A , M S (Texas A&M) Ph D (Texas at Austin)

Research interests

Tertiary oil recovery
Unconventional low energy separation processes
Dynamics of multicomponent mass transfer processes
Surface phenomena and adsorption kinetics



Jeffrey H Harwell

Kenneth E Starling

George Lynn Cross Research Professor, School of Chemical Engineering and Materials Science

B S (Texas A&M), M S , Ph D (Illinois Institute of Technology)

Research interests

Equation of state development of thermodynamic and phase behavior
Equilibrium and non equilibrium molecular theory of fluids
Correlation of transport properties
Process simulation
Geothermal, ocean thermal solar and waste heat energy conversion



Kenneth E Starling



John F. Scamehorn

John F. Scamehorn

Asahi Glass Chair Professor School of Chemical Engineering and Materials Science
B.S. M.S. (Nebraska) Ph.D. (Texas at Austin)

Research interests

- Surface and colloid science
- Tertiary oil recovery
- Detergency
- Membrane separations
- Adsorption pollution control



Raymond D. Daniels

Raymond D. Daniels

Professor and former School Director School of Chemical Engineering and Materials Science
B.S. M.S. Ph.D. (Case Institute of Technology)

Research interests

- Physical metallurgy
- Gases in metals
- Corrosion
- Metal fracture



Lance L. Lobban

Lance L. Lobban

Associate Professor, School of Chemical Engineering and Materials Science
B.S. (Kansas), Ph.D. (Houston)

Research interests

- Catalytic reaction rate mechanisms and modelling
- Partial oxidation of hydrocarbons
- Synthesis of refractory powders



Edgar A. O'Rear, III

Edgar A. O'Rear, III

Professor School of Chemical Engineering and Materials Science and
Associate Dean for Research
B.S. (Rice) S.M. (MIT) Ph.D. (Rice)

Research interests

- Transport especially in biomedical systems: biorheology, mechanical trauma to blood tissues, erythrocyte deformability, blood substitutes, thrombolysis, ultrathin films, surfactants and particularly novel surfactants, scanning probe microscopy



Richard G. Mallinson

Richard G. Mallinson

Associate Professor School of Chemical Engineering and Materials Science and
Director of the Center for Gas Utilization and Processing Technologies
B.S.E. (Tulane) M.S. Ph.D. (Purdue)

Research interests

- Chemical catalytic and biomedical rate processes
- Synthesis fuels
- Polymerization and depolymerization of crosslinked polymer
- Methane conversion technology



Brian P. Grady

Brian P. Grady

Assistant Professor School of Chemical Engineering and Materials Science
B.S. (Illinois) Ph.D. (Wisconsin Madison)

Research interests

- Polymer coated surface
- Ion containing polymers
- Polymer composite
- X-ray absorption spectroscopy



Ralph T. Yang

The University Of Michigan

Ralph T. Yang

Professor and Chairman Department of Chemical Engineering
B.S. (National Taiwan) M.S. Ph.D. (Yale)

Research interests

- Adsorption
- Environmental catalysis
- Gasification
- Gas carbon reaction

Erdogan Gulari

Professor, Department of Chemical Engineering and Former Associate Dean for Academic Affairs

B S (Roberts College), Ph D (Cal Tech)

Research interests

- Structure of solutions by spectroscopic techniques
- Surfactant solutions for selective separation and encapsulation
- Ceramic powder making and chemical vapor deposition
- Reaction mechanism for heterogeneous catalysts



Erdogan Gulari

H Scott Fogler

The Ame and Catherine Venema Professor, Department of Chemical Engineering

B S (Illinois), M S , Ph D (Colorado)

Research interests

- Microelectronics processing
- Colloidal phenomena and catalyzed dissolution of mineral
- Colloidal phenomena of non absorbing hydrocolloids electrostatic stabilization
- Flocculation dynamics of biosystems



H Scott Fogler

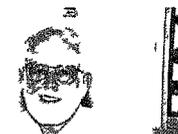
Brice Carnahan

Professor, Department of Chemical Engineering

B S , M S (CWRU), Ph D (Michigan)

Research interests

- Application of computer to chemical process simulation and design
- Development of mathematical tools and software for simulating the dynamic behavior of processing systems
- Design and development of software for delivering educational materials to students and practicing engineers



Brice Carnahan

James O Wilkes

Professor, Department of Chemical Engineering

B A (Cambridge), M S , Ph D (Michigan)

Research interests

- Application of numerical methods in the flow of polymer/petroleum
- Solution of partial differential equations using the finite element method



James O Wilkes

Johannes Schwank

Professor, Department of Chemical Engineering

Diploma (Chem), Ph D (Innsbruck)

Research interests

- Development of design criteria for heterogeneous catalysts
- Investigation of principles of nucleation clustering and growth of metal particles on dielectric support materials
- Development of highly sensitive and selective microelectronic sensor arrays



Johannes Schwank

Richard M Lane

Associate Professor, Department of Materials Science and Engineering

B S (California State), Ph D (Southern California)

Research interests

- Fibers for light weight, high strength structure
- High temperature composites
- Tailored inorganic and organometallic polymers
- Thin ceramic coatings on carbon fiber tows



Richard M Lane

David C Martin

Associate Professor Department of Materials Science and Engineering

B S , M S (Michigan), Ph D (Massachusetts)

Research interests

- High resolution studies of micromechanisms of deformation in polymer solids
- Direct imaging of disorder in liquid crystalline system
- Thermodynamics of deformation processes
- Morphology of high performance polymer composites
- Crystal structure and its evolution in polymers



David C Martin



Alexander M Jamieson

Case Western Reserve University

Alexander M Jamieson

Professor and Chairman, Department of Macromolecular Science
B S (Glasgow), D Phil (Oxford)

Research interests

Laser light scattering from polymer systems
Relaxation and viscoelastic properties of macromolecules in solution and bulk
Structure function relationships of proteins and polysaccharides
Polymers at interfaces



Jack L Koenig

Jack L Koenig

The J Donnell Institute Professor Department of Macromolecular Science
B S (Yankton College), M S , Ph D (Nebraska)

Research interests

Polymer structure property relationships using infrared Raman NMR spectroscopy
and spectroscopic imaging techniques



Hatsuo Ishida

Hatsuo Ishida

Professor and Director of the NSF Center for MMC
B S , M S (Doshisha), Ph D (CWRU)

Research interests

Molecular spectroscopy of synthesis polymers and composites
Structural analysis of surfaces and interfaces
Synthesis of polymers for composite applications
Processing of polymers and composite materials
Processing variable structure property correlation



Morton Litt

Morton Litt

Professor Department of Macromolecular Science
B S (The City College), M S Ph D (Polytechnic Institute of Brooklyn)

Research interests

Kinetics and mechanisms of free radical and ionic polymerization
Fluorocarbon chemistry
Synthesis of novel monomers and polymers
Crosslinked liquid crystal polymers



John Blackwell

John Blackwell

Professor, Department of Macromolecular Science
B S , Ph D (Leeds)

Research interests

Determination of the solid state structure and morphology of polymers
X ray analysis of the structure of thermotropic copolyesters copolyimides polyure
thanes polysaccharides
Computer molecular modeling of polymers



Steven D Hudson

Steven D Hudson

Assistant Professor Department of Macromolecular Science
B S (Cornell), Ph D (Massachusetts)

Research interests

Exploitation of fundamental problems in physics of ordered polymer systems
Electron microscopy and x ray diffraction studies of microphase separated semi
crystalline liquid crystalline or nanocomposite systems



Ica Manas Zloczower

Ica Manas Zloczower

Professor, Department of Macromolecular Science
B S M S (Polytechnic Institute) D Sc (Technion Israel Inst. of Tech)

Research interests

Structure and micromechanics of fine particle clusters
Dispersive mixing mechanisms and modeling
Design and mixing optimization studied for polymer processing

Shi Qing Wang

Associate Professor, Department of Macromolecular Science
 B S (Wuhan), Ph D (Chicago)

Research interests

Non equilibrium statistical mechanics and rheology of complex fluids
 Flow properties and dynamics of polymers, liquid crystals, macromolecular self
 assembling systems and colloid dispersions
 Diffusion and transport in polymers



Shi Qing Wang

Visiting Faculty**Amit Chakma**

Professor and Dean of Engineering, University of Regina, Canada
 Ph D (British Columbia)

Research interests

Gas processing applications
 Gas separation utilizing chemical solvents and membranes
 Amine degradation and reclamation



Frank R Steward

Frank R Steward

Professor and Director of Centre for Nuclear Energy Research,
 Chemical Engineering Department, University of New Brunswick, Canada
 S B , S M , Sc D (MIT)

Research interests

Modelling of fluidized bed combustion chambers
 Radiative properties of combustion products
 Energy utilization and conservation in the chemical and metallurgical industries



Harold A Wittcoff

Harold A Wittcoff

Scientific Advisor, Chem Systems Inc
 B A (DePaul), Ph D (Northwestern)

Research interests

Polymer synthesis
 Specialty chemicals
 Petrochemical industry



Tep Sastri

Tep Sastri

Associate Professor, Department of Industrial Engineering, Texas A&M University
 B Eng (Chula), M S , Ph D (Ohio State)

Research interests

Robotics and material handling system (Operation analysis and system modeling)
 Time series analysis and systems identification (Statistical modeling for estimation
 and real time prediction)
 Process monitoring algorithm and control chart design (Quality engineering)



Vira Chankong

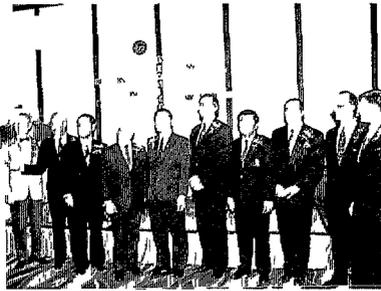
Vira Chankong

Associate Professor, Department of Systems Engineering, Control and
 Industrial Engineering Case Western Reserve University
 B S B E (New South Wales) M S (AIT) Ph D (CWRU)

Research interests

Methodologies for improving quality and productivity of flexible
 manufacturing systems
 Systems analysis and decision making
 Statistical process control

Graduate Students



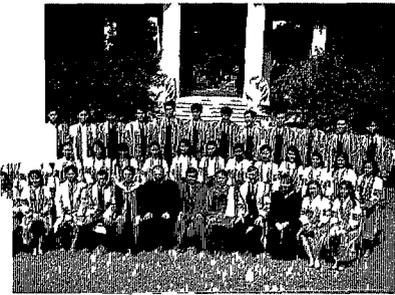
The party celebration of the first class of graduates July 1995

The College accepts students with bachelor's or master's degrees in Chemical Engineering, Chemical Technology or Industrial Chemistry for its Petrochemical Technology programs. For the Polymer Science programs, degrees in Materials Science, Polymer Science or Chemistry are required. Students must possess a GPA of not less than 2.7 and a TOEFL score of at least 530 to be eligible for the programs. The College's reputation of being a world class institute has served to attract top students from universities all over Thailand. There are also a number of applications from overseas students every year.

Student Profiles

The College has from 1993-1997 accepted five classes of students in its International Master Degree programs. The number of students has increased sharply from an average of 37 during the first three years to 49 in 1996 and 52 in 1997 with the number of students in the Petrochemical Technology program being slightly higher than that in Polymer Science. The number of overseas students has also increased in 1997 with 2 from Myanmar and 2 from Vietnam. The first class of students in the Ph.D. programs, which started in 1997, consists of 4 students with 2 in each program. The College intake continues to maintain a significant proportion of students with working experience which helps to enrich the learning experience of all students. A number of companies have also found the programs at the College to be useful and have sent their staff to study at the College.

The average GPA of the students accepted to the College has remained high at above 3.0 even though the average intake has increased. The majority of students in the Petrochemical Technology program have a chemical engineering background while students in Polymer Science program have mainly materials science and chemistry backgrounds.



First class graduation 1995

Student Profiles

Academic Year Program	1993		1994		1995		1996		1997	
	M	S	M	S	M	S	M	S	M	S
Total Students	39		35		36		49		52	4
Petro Tech major	21		18		19		26		27	2
Polym Sci major	18		17		17		23		25	2
Male	17		12		15		19		22	2
Female	22		23		21		30		30	2
Average GPA	3.09		3.20		3.03		3.00		3.02	3.70
Average age years	23		23.4		22.6		22.4		22.6	27.8
Students with working experience	16		5		13		8		13	3
Company employees on study leave	2						2		4	2
Overseas students			1		1				3	1
Countries represented	2		2		2		1		3	2
	(T U)		(T C)		(T M)		(T)		(T M V)	(T M)

T = Thailand U = USA C = China M = Myanmar V = Vietnam

Undergraduate Background

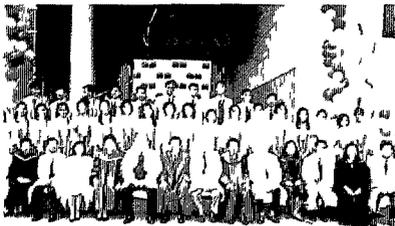
Aerodynamics		1				
Agricul Ind			1			
Anal Chem					1	
Bio Tech				1		
Chem Eng	22	16	14	22	21	
Chemistry	6	8	9	11	12	
Elec Eng	1					
Ind Chem	5	2	4	6	6	
Mat Sci	4	7	4	7	9	
Mat Tech				1		
Mech Eng				1		
Petro Chem						1
Petro & Polym Mat						1
Plastic Eng Tech	1		1	1	1	
Pharmacy		1				
Polym Sci			2			

Graduate Background (Ph.D. Candidates)

Chem Tech		1
Petro Tech		1
Polym Sci		2



Second class graduation 1996



Third class graduation 1997

Student Exchange Program

As part of their study at the College, students are given the opportunity to visit one of the three U S universities for a period of time in order to work on part of their thesis project. During the visit, students are exposed to the latest technology in their fields and the vast information available at the U S universities. The students also have the opportunity to come into contact with their U S counterpart students and to discuss aspects of their work with students who are also working with the same U S professors. Most of the students have made the trip to a U S university and found it to be one of the most valuable experiences they have gained from attending the graduate programs at the College. Most of these trips were funded by USAID through the UDLP Project with a few visits being sponsored by U S professors' own research funds and by the College.

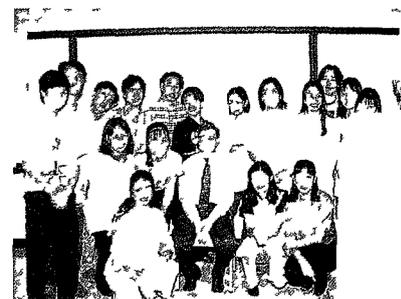
Summary of the Number of Students Visiting the Three U S Universities

Student Class	Major	Total Students	No of Student Visits			Total
			CWRU*	UM*	OU*	
First Class (1993-1995)	Petro Tech	21		3	17	20
	Polymer Sci	18	7	10		17
Second Class (1994-1996)	Petro Tech	18		9	9	18
	Polymer Sci	17	10	7		17
Third Class (1995-1997)	Petro Tech	19		9	10	19
	Polymer Sci	17	4	4		8
Total		110	21	42	36	99

* CWRU Case Western Reserve University
 UM The University of Michigan
 OU The University of Oklahoma

Student Employment after Graduation

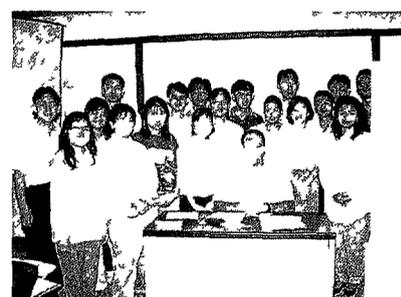
Students from the College readily obtain employment after graduation. They are given the same recognition as students who have graduated from overseas universities. Most students have found jobs in the industries in their fields which range from petroleum and petrochemicals to polymers and related industries. A few students have furthered their study abroad. With the continued growth of the petrochemical and related industries, job opportunities for students are expected to remain as good as, if not better than previous years.



Prof. Johannes Schwank and the Petrochemical Technology Students



Prof. Hatsuo Ishida and the Polymer Students

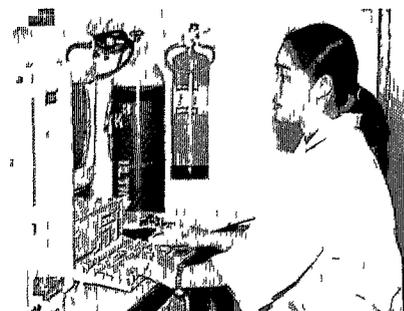


Prof. Richard Mallinson and the Petrochemical Technology Students



Prof. Alexander Jamieson at the third class graduation 1997

Student Employment after Graduation



Company / Organization	Student Class		
	First Class 1995*	Second Class 1996*	Third Class 1997*
Petrochemical Technology			
Chemical Technology Department CU	1		
Dow Chemical Thailand Co Ltd	1		
Electricity Generating Authority of Thailand		2	1
Esso (Thailand) Public Co Ltd	2	2	2
Eternal Petrochemical Co Ltd	1		
JJ Degussa (Thailand) Co , Ltd	1		
National Petrochemical Public Co Ltd	4	1	1
PTT Exploration & Production Public Co Ltd		1	
Rayong Refinery Co Ltd	2		1
Star Petroleum Refining Co Ltd			1
Thai Lube Base Oil Co Ltd			1
Thai Oil Co Ltd	1	3	1
Thai Olefins Co Ltd		1	1
Thai Plastic and Chemicals Public Co Ltd			1
Thai Polyethylene Co Ltd	1		
The Aromatic (Thailand) Public Co Ltd	2	2	2
The Bangchak Petroleum Public Co Ltd		1	2
The Shell Company of Thailand Limited	1		
Tuntex Petrochemical Public Co Ltd		2	
Studying Abroad	3		1
Studying at PPC			1
Others	1	3	3
Polymer Science			
Apex Petrochemical Co Ltd	1	1	
Bank of Thailand	2		
Bayer Thai Co , Ltd		1	
Burapha University			1
Dow Chemical (Thailand) Co , Ltd	1		
Eternal Petrochemical Co , Ltd			1
International Cosmetic Co Ltd	1		
JJ Degussa (Thailand) Co , Ltd	1		
Jotun (Thailand) Co , Ltd	1		
King Mongkut's Institute of Technology, Thonburi			3
National Petrochemical Public Co Ltd			1
Petroleum Authority of Thailand		1	1
Premier Products Co Ltd	1		
Seagate (Thailand) Co Ltd	1		
Siam Fiberglass Co Ltd		1	
Submicron Technology Co Ltd	1	7	
Thai Olefins Co , Ltd		1	
Thai Petrochemical Industry Public Co Ltd	2	1	
Thai Polyacetal Co Ltd			1
Thai Polycarbonate Co Ltd		1	1
Thai Polyurethane Co Ltd		1	
The Aromatic (Thailand) Public Co Ltd	2		
TOA Group of Companies	1		1
Studying Abroad	1		1
Studying at PPC			2
Others	2	2	4
Total	39	35	36

Year of Graduation

Research Activities

One of the major aims of the Petroleum and Petrochemical College is to become a center of excellence in research in petrochemical technology and polymer science. With the new, state of the art instruments already installed, the College is able to carry out a wide range of high quality in depth research projects. The direction of research at the College is partly set by initiation from U.S. professors who come to teach at the College, partly by the College's own faculty members and partly through consultations with the industry. At present the College's research activities are focused on 3 main thrust areas with emphasis on petrochemical processes, environmental concerns and innovative processes and polymers. Over the period from 1993-1997, 26 research projects, including 2 on the contract basis, have been carried out by the faculty members, and 110 M.S. theses completed by the students. Contracted projects from the industry are expected to increase as the College research programs become more established.

Research Main Thrust Areas and Current Topics

Catalysis

- Olefin polymerization catalysis
- Methane reforming in a corona discharge
- Characterization of supported gold catalysts
- Development of ambient temperature air purifying catalysts
- Development of nitrogen oxide decomposition catalysts

Applied surfactant technology

- Removal of metal from wastewater using polyelectrolyte enhanced ultrafiltration
- Clean up of oily wastewater using froth flotation
- Paper deinking using froth flotation
- Novel composites via admicellar polymerization

Advanced polymer science

- Rheology and polymer based thin films
- Organo metallic polymers
- Engineering plastics
- Innovative polymers
- Plastics recycling



Publications and Presentations of Research Work

In the quest for excellence the College encourages both its faculty members and students to submit the results of their research findings for publication in leading international journals and to give presentations at local and international venues. Since the start of its International Graduate programs in 1993, 25 papers of the research work carried out at the College have already been published or submitted for publication while 36 presentations have been given mostly at international conferences. Details of the published and submitted papers together with presentations of the research work are given below.



List of Publications and Presentations

Papers Published and Accepted for Publication

- Thammanthadarakul V, O'Haver JH, Harwell JH, Osuwan S, Narinong N, and Widdell WH. Comparison of Rubber Reinforcement Using Various Surface Modified Precipitated Silica. *Journal of Applied Polymer Science* 59: 1741 (1996)
- Tharapattananon N, Scamehorn JF, Osuwan S, Harwell JH, and Haller KJ. Surfactant Recovery from Water Using Foam Fractionation. *Separation Science and Technology* 1: 1233 (1996)
- Bhummasobhana A, Scamehorn JF, Osuwan S, Harwell JH, and Barames S. Surfactant Enhanced Carbon Regeneration in Liquid Phase Application. *Separation Science and Technology* 31: 629 (1996)
- Kittiyanan B, O'Haver JH, Harwell JH, and Osuwan S. Adsorption of Isoprene and Styrene in Adsorbed Cetyltrimethylammonium Bromide Bilayers on Precipitated Silica. *Langmuir* 12: 2162 (1996)
- Daniels R.D., Scamehorn J.F. and Osuwan S. New Graduate Programs in Petrochemical Technology and in Polymer Science at Chulalongkorn University Bangkok Thailand. An International Academic Partnership. *Proceedings of the 1996 Annual American Society of Engineering Education Meeting* Session 2260 (1996)
- Srivannavit O, Osuwan S and Gulari E. Low Temperature CO Oxidation by Cobalt Oxide Supported Silver Catalysts. *Proceedings of the Fifth World Congress of Chemical Engineering* 3: 507-512 (1996)
- Wungrattanasopon P, Scamehorn JF, Chavadej S, Saiwan C, and Harwell JH. Use of Foam Flotation to Remove Tert Butylphenol from Water. *Separation Science and Technology* 31: 1523 (1996)
- Sriratana S, Scamehorn JF, Chavadej S, Saiwan C, Haller KJ, Christian SD, and Tucker EE. Use of Polyelectrolyte Enhanced Ultrafiltration to Remove Chromate from Water. *Separation Science and Technology* 21: 2493 (1996)
- Sirivat A, Kanatharana J, Sukpisarn J, and Wang S.Q. On the Correlation between the Viscosity of Partially Hydrolyzed Polyacrylamide Solution and the Diffusion Coefficient in the Semidilute Regime. *Polymer Engineering and Science* 36: No 24 (1996)
- Tayaniphan S, Dhumrongvaraporn S, Waldner K, and Laine R.M. Synthesis of Spinel Precursor Directly from Al₂O₃ and Tri Ethanolamine. *Chemistry of Materials* 8: 2850-2857 (1996)
- Pairat R, Chavadej S, Fogler H.S. and Browning F.H. Precipitation and Dissolution of Calcium ATMP Precipitates for the Inhibition of Scale Formation in Porous Media. *Langmuir* 13: 1791 (1997)
- Wirasate S, Dhumrongvaraporn S, Allen D.J. and Ishida H. The Molecular Origin of Unusual Physical and Mechanical Properties in Novel Phenolic Materials Based on Benzoxazine Chemistry. *Proceedings of the American Chemical Society Division of Polymeric Materials Science and Engineering* 143: 144 (1997)
- Pongstapodee S, Scamehorn J.F., Chavadej S. and Harwell J.H. Clean up of Oily Waste Water by Froth Flotation. Effect of Microemulsion Formation. *Separation Science and Technology*. In Press

Papers Submitted for Publication

- Thovanich K, Sirivat A, and Wang S.Q. Viscometric and Dynamic Light Scattering Studies of Dilute Poly(methacrylic acid) Solutions. *Journal of Polymer Science: Physics Edition*. Submitted
- Chuchepchukamon W, Osuwan S, Vitsan T, and Gulari E. Low Temperature Total Oxidation of Ethylene on Cobalt Oxide Supported Silver. *Journal of Applied Catalysis*. Submitted
- Sze C, Gulari E, Srivannavit O, and Osuwan S. Ultra High Activity CO Oxidation Catalysts. *Journal of Applied Catalysis*. Submitted
- Punchapetch P, Dhumrongvaraporn S, and Laine R.M. Synthesis of Silatrane Complexes from Silica. *Journal of American Chemical Society*. Submitted
- Thamsatiman P, Harwell J.H., Osuwan S, Chavadej S, and Sabatini D.A. Surfactant Adsorption and Soil Decontamination Using Model Soils. Part I. Negatively Charged Soil Model. *Water Research*. Submitted
- Rattiwat T, Harwell J.H., Osuwan S, Chavadej S, and Sabatini D.A. Surfactant Adsorption and Soil Decontamination Using Model Soils. Part II. Positively Charged Soil Model. *Water Research*. Submitted
- Booncharoensuk P, Harwell J.H., Osuwan S, Chavadej S, and Sabatini D.A. Surfactant Adsorption and Soil Decontamination Using Model Soils. Part III. Hydrophobic Soil Model. *Water Research*. Submitted
- Chintanasathien C, Rodriguez C.H., Scamehorn J.F., Saiwan C, and Chavadej S. Precipitation of Solutions Containing Mixtures of Synthetic Anionic Surfactant and Soap. *Journal of the American Oil Chemists Society*. Submitted
- Kimchuwanit W, Scamehorn J.F., Osuwan S, Haller K.J., and Harwell J.H. Use of a Surfactant Coacervate Phase to Extract Trichloroethylene from Water. *Langmuir*. Submitted
- Thakulsukanant C, Lobban L.L., Osuwan S, and Waritswat A. Adsorption and Stability Characteristics of Hydrocarbon Aggregate Chemically Bonded to Porous Silica. *Langmuir*. Submitted
- Sukpisarn J, Kanathanara J, Sirivat A, and Wang S.Q. The Specific Viscosity of Partially Hydrolyzed Polyacrylamide Solutions. Effects of the Degree of Hydrolysis, Molecular Weight, Solvent Quality, and Temperature. *J. Polymer Science Part B: Polymer Physics*. Submitted
- Rujthumkul S, Sirivat A, and Jamieson A. Conformational Change of HPC-HTAB Complexes Studied by Dynamic Light Scattering and Viscometry. *J. Polymer Communications*. Submitted

Presentations

Tayanphan S Dhumrongvaraporn S and Laine R M Modification of Spinel Polymer Precursor with Glycerol *3rd International Conference on Frontiers of Polymers and Advanced Materials* Kuala Lumpur Malaysia (January 1995)

Punchapetch P Dhumrongvaraporn S and Laine R M Synthesis of $[N(CH_2CH_2O)_3Si(OCH_2CH_2O)]_n$ A Silatrane Directly from Silica *3rd International Conference on Frontiers of Polymers and Advanced Materials* Kuala Lumpur Malaysia (January 1995)

Dhumrongvaraporn S Tayanphan S Laine R M and Waldner K F Synthesis of an Alkoxide Precursor to Spinel $(MgAl_2O_4)$ Directly from $Al(OH)_3$ and MgO *3rd International Conference on Frontiers of Polymers and Advanced Materials*, Kuala Lumpur Malaysia (January 1995)

Petchsuk A Dhumrongvaraporn S and Laine R M Synthesis of Alumatrane Oligomers *3rd International Conference on Frontiers of Polymers and Advanced Materials* Kuala Lumpur Malaysia (January 1995)

Suwankrughasn M Dhumrongvaraporn S and Laine R M Properties of Silatrane Glycolate Polymer *3rd International Conference on Frontiers of Polymers and Advanced Materials* Kuala Lumpur Malaysia (January 1995)

Viboonrungsan S Petchsuk A Dhumrongvaraporn S and Laine R M Properties of Alumatrane Oligomers *3rd International Conference on Frontiers of Polymers and Advanced Materials* Kuala Lumpur Malaysia (January 1995)

Kanatharana J Sukpisan J, Wang S Q and Srivata A Concentration Dependence of the Solution Viscosity and the Relaxation Time of the Partially Hydrolyzed Polyacrylamide *209th American Chemical Society* Anaheim California (April 1995)

Nawadhinsukh P Saiwan C Tantayanon S and Ishida H Investigation of Phenolphthalein Based Polybenzoxazine under Curing *21st Congress on Science and Technology of Thailand* Chonburi Thailand (October 1995)

Saiwan C Aussawasathien D Tantayanon S and Ishida H Synthesis of Benzoxazine Based Phenolic Derivatives *21st Congress on Science and Technology of Thailand* Chonburi Thailand (October 1995)

Bhummasobhana A Scamehorn J F Harwell J H Osuwan S and Baramee S Use of Surfactant Enhanced Carbon Regeneration for Wastewater Applications *American Institute of Chemical Engineers Annual Meeting* Miami Beach (November 1995)

Piboonchaisit P Dhumrongvaraporn S Laine R M Silatrane Complexes from SiO_2 and Triisopropanolamine *4th International Conference on Polymer Characterization* University of North Texas U S A (January 1996)

Rangsitphol J Dhumrongvaraporn S Laine R M Synthesis of Aryloxysilane Liquid Crystal Precursor Directly from SiO_2 and Catechol *4th International Conference on Polymer Characterization* University of North Texas U S A (January 1996)

Srivata A Kanatharana J and Sukpisan J On the Correlation between the Viscosity of Partially Hydrolyzed Polyacrylamide Solution and the Diffusion Coefficient in the Semi dilute Regime *4th International Conference on Polymer Characterization* Denton Texas (January 1996)

Opornsawad Y Dhumrongvaraporn S Laine R M The Synthesis of Alumatrane Complexes Directly from $Al(OH)_3$ and Triisopropanolamine *4th International Conference on Polymer Characterization* University of North Texas Denton (January 1996)

Kimchuwanit W Scamehorn J F Osuwan S Haller K J and Harwell J H Use of a Surfactant Coacervate Phase to Extract Trichloroethylene from Water *211th American Chemical Society National Meeting* New Orleans (April 1996)

Gulari E Sze C Srivannavit O and Osuwan S A New Class of Air Cleaner Catalysts *Warsaw Conference on the Environment* Warsaw Poland (April, 1996)

Rodriguez C H Scamehorn J F Chintanasathien C Saiwan C and Chavedej S Precipitation of Solutions Containing Mixtures of Synthetic Anionic Surfactant and Soap *87th Annual American Oil Chemists Society Meeting* Indianapolis (April 1996)

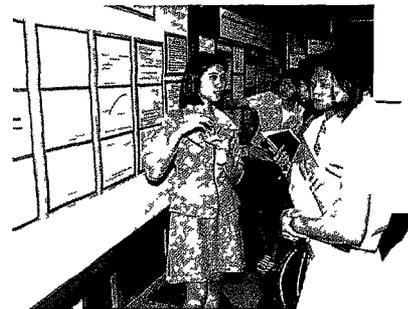
Daniels R D Scamehorn J F and Osuwan S New Graduate Programs in Petrochemical Technology and in Polymer Science at Chulalongkorn University, Bangkok Thailand An International Academic Partnership *Annual American Society of Engineering Education Meeting* Washington (June 1996)

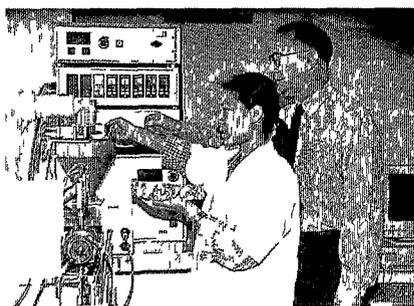
Srivannavit O Osuwan S and Gulari E High Activity CO Oxidation Catalysts *5th World Congress of Chemical Engineering* (July 1996)

Kanchanasopa M Yanumet N and Ishida H The Effect of Curing Conditions on the Volumetric Expansion of Bisphenol A and Aniline Based Polybenzoxazine *212th American Chemical Society National Meeting* Orlando (August 1996)

Gulari E Ziff R M and Vidayanakorn T Monte Carlo Simulation of CO NO Reaction *American Institute of Chemical Engineers Annual Meeting* Chicago (November 1996)

Gulari E Sze C Srivannavit O Srivannavit S and Osuwan S Synthesis and Characterization of Ultra High Activity Low Temperature CO Oxidation Catalysts *American Institute of Chemical Engineers Annual Meeting* San Francisco (November 1996)





- Arthasart Y, Trakulcoo K and Martin D C The Influence of Reprocessing History on the Properties of High Density Polyethylene (HDPE) *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Kumcharoen C, Trakulcoo K and Martin D C The Influence of Processing History on the Fracture Surfaces of HDPE, HDPE and PET Blends, Nylon 6, 6 and PEI *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Jensuksup P, Trakulcoo K and Martin D C Characterization of Reprocessed HDPE and PET Blend Comparison Between Binary Blends and Ternary Blend with Maleated Polyolefin Compatibilizer *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Chalauyduromong S, Trakulcoo K and Martin D C Reprocessing of Engineering Thermoplastic (Nylon, PEI, POM) Effects on Thermo-Physical Properties *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Thienthanawamith K, Trakulcoo K and Martin D C Reprocessing of Engineering Thermoplastics (Nylon, PEI, POM) Effects on the Mechanical Properties *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Tuntayanupon M, Trakulcoo K and Gulari E An Experimental Study of Permeation of Representative Gasoline Components Through HDPE Film *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Sirivat A and Polnak R The Effect of HDPE/LDPE Blend Composition on the Melt Flow Instability and Extrudate Textures *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Wongsomnuk P and Sirivat A The Effect of Molecular Weight of LLDPE on the Characteristics of the Melt Flow Oscillating Regimes *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Naiyakul N and Sirivat A The Effect of Varying HDPE/PP Blend Composition on the Characteristics of the Melt Flow Oscillating Regimes *PPS96 Conference on Polymer Processing Towards AD 2000* Singapore November 26-28 1996
- Silpa archa M, Dhumrongvaraporn S and Laine R M One Step Synthesis of Liquid Crystalline Copolymer Directly from SiO₂, Catechol and Hydroquinone *5th International Conference on Polymer Characterization* University of North Texas Denton January 8-10 1997
- Laobuthee A, Dhamrongvaraporn S and Laine R M Elementary Study of the Microstructural Evolution During Sintering of Ceramic Precursor to Spinel *5th International Conference on Polymer Characterization* University of North Texas Denton January 8-10 1997
- Mya K Y and Sirivat A A Study of Complex Formation between PAM and Triton X100 *APS Annual Meeting Division of High Polymer Physics* Kansas City (March 1997)
- Sriratana S, Scamehorn J F, Chavadej S, Sawan C, Haller K J, Christian S D and Tucker E E Use of Polyelectrolyte Enhanced Ultrafiltration to Remove Chromate from Water *213th American Chemical Society National Meeting* San Francisco (April 1997)
- Tharapiwattananon N, Scamehorn J F, Osuwan S, Harwell J H and Haller K J Surfactant Recovery from Water Using Foam Fractionation *88th Annual American Oil Chemists Society Meeting* Seattle (May 1997)

Students Research Topics

Within the fields of Petrochemical Technology and Polymer Science the students carry out a wide and varied range of research topics based on both fundamental and applied research with emphasis on the 3 thrust areas. The list of students' thesis topics during the period 1995-1997 is shown below.

Thesis Topics of Students Awarded the M S Degrees in 1996 (Second Class 1994-1996)

M S Degree in Petrochemical Technology

- Nisachon Chinpan** Comparison of Rubber Reinforcement Using Various Surface Modified Silicas
- Sangobtip Pongstabodee** Removal Ortho Dichlorobenzene by Froth Floation Under Winsor's Type III Conditions
- Supiruk Sirisithichote** Surfactant Enhanced Carbon Regeneration in Liquid Phase Applications
- Thanyaboon Sutad na Ayoothaya** Surfactant Enhanced Carbon Regeneration
- Kamolwan Wongkolkitsulp** Propane Dehydrogenation over Platinum Catalyst Influence of Promoters on Activity and Coking
- Opart Charuratana** Propane Dehydrogenation over Platinum Catalyst Decoking Performance
- Khanti Thanyachotpaiboon** The Study of Methane Conversion under the Influence of an AC Electric Discharge

Sompop Srivannavit, Low Temperature CO Oxidation Catalyst by Reducible Metal Oxide Supported Silver Catalysts

Suchart Powattanasatiant Development and Characterization of NO Reduction and CO Oxidation Catalysts for Catalytic Cleaning of Diesel Engine Exhaust Emissions

Sarunyu Limwongse Catalysts for Total Combustion

Paisarn Ketpukdeekul Development of Catalytic Water Sterilizers and Purifiers

Rattanawalee Sukonrat The Catalyst Development for Polypropylene Synthesis

Jeerawat Pattanasomsit, The Oxygen Storage Catalyst

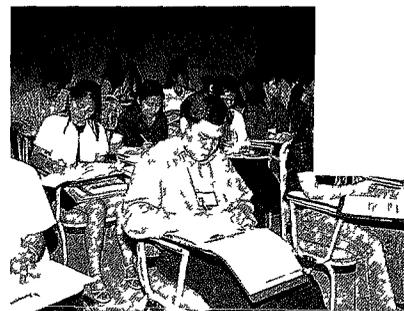
Wang Zhen The Effects of Pore Size and Pore Size Distribution on Adsorption Kinetics

Chamarong Thakulsukanant Formation of Hydrocarbon Aggregates Chemically Bonded to Mineral Oxide Surface

Acharee Sirwongse Aggregation and Growth of Model Silica Particles

Parat Rerkpattanapipat Study of Precipitation and Dissolution of Calcium Phosphonate in Porous Media for Enhancement of Squeeze Lifetimes

Pornruedee Permsukarome Reaction Kinetics of Asphaltene Dissolution by Amphiphile/Alkane Solution



M S Degree in Polymer Science

Supa Wirasate The Molecular Origin of Unusual Physical and Mechanical Properties in Novel Phenolic Materials Based on Benzoxazine Chemistry

Nimolrat Suprapakorn Effect of CaCO_3 on the Mechanical and Rheological Properties of Benzoxazine Resin and Polybenzoxazine

Sawitree Buranapaiboon The Study of Polybenzoxazine Adhesive for Aluminum

Pachareeya Kulanuch Effects of Sizing Agents on Silanol Condensation of Silane in Solution

Mantana Kanchanasopa The Effect of Curing Conditions on the Volumetric Expansion of Bisphenol A and Aniline based Polybenzoxazine

Sucheera Rujithumkul Conformation Change of HPC HTAB Complexes Studied by Dynamic Light Scattering and Viscometry

Suwanna Lertsukulbanlue Diffusion of Polystyrene Sphere in Hydroxypropyl Cellulose Solution Studied by Dynamic Light Scattering and Viscometry

Rathakrai Sirisook Effect of Block Copolymer as Compatibilizers for Immiscible Blends

Pattaree Vongpaisal Effect of Physical Aging on Tensile Creep of Polystyrene and Poly(2,6-dimethyl-1,4-phenylene oxide) Blends

Raviwan Khongkhanoy Effect of Physical Aging on Tensile Creep of Poly(methylmethacrylate) and Poly(styrene acrylonitrile) Blends

Pensri Pboonchaisit Silatrane Complexes from SiO_2 and Triisopropanolamine

Yukoltorn Opornsawad Synthesis of Alumatrane Complexes Directly from $\text{Al}(\text{OH})_3$ and Triisopropanolamine

Ying anong Attasart The Influence of Reprocessing on the Properties of Commodity Plastic Container High Density Polyethylene (HDPE)

Kamolrat Thienthanawanith Reprocessing of Engineering Thermoplastics (Nylon 66 PEI POM) Effects on the Mechanical Properties

Suwimol Chaluyadumrong Reprocessing of Engineering Thermoplastics (Nylon 66 PEI POM) Effects on the Thermo Physical Properties

Chatchayane Kumcharoen The Influence of Processing History on Fracture Surfaces of HDPE HDPE and PET Blend Nylon 66 and PEI

Pornsak Jenuksup Miscibility and Compatibility of Reprocessing of HDPE and PET Blend

Thesis Topics of Students Awarded the M S Degrees in 1997 (Third Class 1995-1997)

M S Degree in Petrochemical Technology

Penny Ratanarojanatam Clean Up of Oily Waste Water by Froth Flotation Effect of Microemulsion Formation by Surfactant Mixtures

Sirrat Chaisri Equilibrium Precipitation of Barium Chromate from an Aqueous Solution of a Cationic Polyelectrolyte

Krit Kampabooth, Surfactant Recovery from Water Using Foam Fractionation Effect of Temperature and Added Salt

Rachada Pokhun Surfactant Enhanced Carbon Regeneration in Vapor Phase Applications



Surat Sakulwongyai Distribution of Chlorinated Alkanes between the Coacervate and Dilute Aqueous Phases Induced by Nonionic Surfactants and Comparison to Solubilization in Micelle

Anawat Sopapong Activity and Selectivity Enhancement of Hydrodesulfurization Catalysts

Sohpon Butamjai Ambient Temperature CO Oxidation on Composite Oxides Supported Silver Catalyst

Jiranaree Kotchaphan Development and Characterization of NO Reduction and CO Oxidation Catalyst for Catalytic Cleaning of Engine Exhaust Emissions

Supachan Pitchayanont UV Initiated Polymerization of Styrene in Oil in Water Microemulsion

Natchna Saimongkol Propane Dehydrogenation over Ti Promoted Pt-Sn Catalysts: Influence of Promoters on Activity and Coking

Supachai Kruayattidee Propane Dehydrogenation over Li Promoted Pt-Sn Catalysts: Influence of Promoters on Decoking Performance

Pattama Poonphanapricha Methane Conversion in an AC Electric Discharge

Manat Manantapong Adsorption Kinetics of an Ion Exchange Column

Piyaporn Pongbhai Characterization of Pd-Ag-Al₂O₃ Selective Hydrogenation Catalysts

Pakornphant Chantaraviton Characterization of Platinum Catalysts: Adsorption and Temperature Programmed Desorption of Oxygenated Compounds

Channasit Srisaichua Effect of Surfactant Carbon Chain Length on Adsorption Isotherms of Molecular Sieve MCM-41

Rapee Kudisri Comparison of Surface Modified Fillers to Clay for Natural Rubber Composites

Piyarat Wattana Dissolution Kinetics of Scale Inhibitors in the Presence of High Concentration of Calcium

Waraporn Pumpaisanchai Dissolution Kinetics of Fractionated Asphaltenes

M.S. Degree in Polymer Science

Viturach Goodwin Application of Polybenzoxazines for Natural Fiber Reinforced Plastics

Wanida Siripattanasarakit A Novel Type of Ion Separation Material Using Host-Guest Properties of the Polybenzoxazine Local Structure

Bunyarit Rochanaiaat Effects of Sizing Agent on Silanol Condensation of Silane in Solution

Supranee Kaewpirom Time-Temperature Superposition of Viscoelastic Functions of PMMA/SAN Blends at Temperatures above and below T_g

Milntra Pokaew The Effect of Diblock Copolymer as Compatibilizer for Immiscible Blends

Chanintra Phongphour Molecular Engineering of Nanocomposite Polypropylene for Increased Resistance to Slow Crack Growth and Mechanical Properties

Nattakamol Naiyakul The Effect of Varying HDPE/PP Blend Composition on the Characteristics of the Melt Flow Oscillation Regimes

Patsuda Wongsomnuk A Study of Sharkskin Defect in Linear Low Density Polyethylene

Hathakarn Choosuwan Yellow Oil Formation at Acid Gas Removal Unit in an Ethylene Plant

Naiyana Asawakanjana Polyimide Films as Protective Polymer for Microelectronics Gas Sensor

Thanyalak Chaisuwan Processing of Polymers from SiO₂ and Glycerol

Montri Silpa-archa One-Step Synthesis of Novel Copolymer Directly from Silica, Catechol, and Hydroquinone

Apirat Laobuthee Synthesis of MgAl₂O₄ Spinel and Its Application as a Humidity Sensing Element

Narumon Phongpisitsakun One-Step Synthesis of Liquid Crystalline Copolymer Butylcatechol

Prasert Prasangleungvilai Influence of Carbon Black Aggregate Structure on Agglomerate Packing Characteristics

Anucha Leelertsakulwong Influence of Carbon Black Aggregate Structure on Agglomerate Dispersion Behavior

Khine Yi Mya Interactions between Non-ionic Surfactant and Polyacrylamide Studied by Light Scattering and Viscometry

Thesis Topics of Current Second Year Students (Fourth Class 1996 1998)

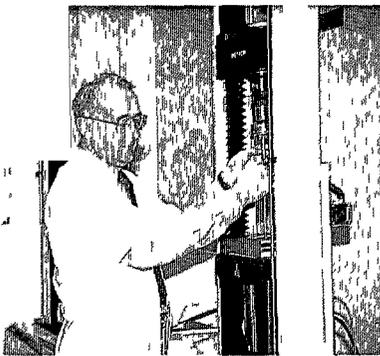
Petrochemical Technology Program

- Panomkorn Kwakhong** Mechanism of Ore Flootation
Advisors J H Harwell and S Chavadej
- Sang aroon Aowiriyakul** Correlation between Microemulsion and Macroemulsion Stability
Advisors J H Harwell and C Saiwan
- Pornkamol Phanpao** Use of an Ultrafiltration/ Precipitation to Remove Chromate from Wastewater
Advisors J F Scamehorn and C Saiwan
- Dusadeeporn Watanavitukul** Foaming of Nonionic Surfactants
Advisors J F Scamehorn and N Yanumet
- Piyapon Hongpaya** Foaming of Anionic Surfactant/Soap Mixtures
Advisors J F Scamehorn and N Yanumet
- Thapanawat Nitithanyarattana** Precipitation of Mixtures of Anionic Surfactant and Soap
Advisors J F Scamehorn and C Saiwan
- Arisara Suthasut** Alkane Dehydrogenation Part I
Advisors R G Mallinson S Osuwan and P Chaiyavech
- Pisarn Teerasukaporn** Alkane Dehydrogenation Part II
Advisors R G Mallinson S Osuwan and P Chaiyavech
- Niwat Athiwattananont** Suspension Polymerization
Advisors R G Mallinson S Osuwan and R Magaraphan
- Malnee Leethochawalit** Electric Field Studies CH_4 Reforming with CO_2 as a Means of CO_2 Utilization
Advisors L L Lobban and S Chavadej
- Pornthep Santipornvit** Ozone Degradation of Aqueous Contaminants in Bonded Admicelles
Advisors L L Lobban and S Chavadej
- Siriporn Jongpatiwut** Bonded Fluorocarbon Admicelles Production and Adsolubilization Properties
Advisors L L Lobban and T Rirksomboon
- Thanyarat Tatyakiatisakun** Gas Carbon Reactions
Advisors R T Yang and T Rirksomboon
- Kornthep Prasirtsurphan** Selective Hydrogenation Kinetics of Pd and Pd Ag Catalysts
Advisors J Schwank and S Osuwan
- Savant Boonyasuwat** Dynamic Models for Real (Sub) Processes in a Thai Industrial Plant
Advisors B Carnahan P Piumsomboon and T Rirksomboon
- Patikom Saelee** A General Fluid Network Simulator
Advisors J O Wilkes P Piumsomboon and T Rirksomboon
- Paisan Lorpongpaiboon** Catalytic Decomposition of NO_x
Advisors E Gulari and S Osuwan
- Malee Santikunaporn** Water Sterilization by Supported Silver Catalysts
Advisors E Gulari and S Chavadej
- Jiraporn Leerat** Ambient Temperature CO Oxidation by Supported Gold and Silver Catalysts
Advisors E Gulari and S Osuwan
- Chongkiat Visetjung** Microemulsion Polymerization
Advisors E Gulari and S Osuwan
- Pailin Ngaotranawiwat** Catalyst Development for Methane Reforming with CO_2
Advisors E Gulari K Bunyakiat and T Rirksomboon
- Veerapat Tantayakom** Asphaltene Dissolution Asphaltene Effects
Advisors H S Fogler P Piumsomboon and T Rirksomboon
- Napaporn Komesvarakul** Asphaltene Dissolution Surfactant Effects
Advisors H S Fogler and S Chavadej
- Sumate Charoenchaidet** Kinetics of Silica Particle Growth
Advisors H S Fogler and S Chavadej
- Settawat Takulpakdeechoumpon** Colloid Stability
Advisors H S Fogler and S Chavadej
- Ittiporn Suwunnamek** Acidization of Carbonate with EDTA
Advisors H S Fogler and S Chavadej

Polymer Science Program

- Anchulee Pisutwimon** Effect of Surfactant Binding on Chain Configuration and Rheology of Water Soluble Polymers (HPC HTAB)
Advisors A Jameson and A Sirivat
- Warunee Klinklai** A Study of Complex Formation between Nonionic Polymers and Nonionic Surfactants (PAM Triton X or HPC Triton X)
Advisors A Jameson and A Sirivat





- Pimpa Hormnirun** Block Copolymers as Compatibilizers for Immiscible Blends
Advisors: A. Jamieson and A. Sirivat
- Veirawan Nerapusi** Dynamic Light Scattering and Viscoelastic Properties of Liquid Crystal Polymer Solutions Part I
Advisors: A. Jamieson and S. Wongkasemjit
- Pivanun Boonprasert** Dynamic Light Scattering and Viscoelastic Properties of Liquid Crystal Polymer Solutions Part II
Advisors: A. Jamieson and S. Wongkasemjit
- Jintana Nakarapanich** Polymer Surfactant Suspension System
Advisors: A. Jamieson and A. Sirivat
- Methavee Kwaengsobha** Melt Fracture Part I
Advisors: S. Q. Wang and A. Sirivat
- Jeerawan Banyam** Melt Fracture Part II
Advisors: S. Q. Wang and A. Sirivat
- Sangpetch Issarapanitchakit** Nanocomposite of PP and Clay
Advisors: S. D. Hudson and A. Sirivat
- Watchanida Chnpha** Vapor Phase Deposition of Photoresistant and UV Polymerization under Vacuum by Polystyrene
Advisors: E. Gulari and N. Yanumet
- Weera Kiettikul** Vapor Phase Deposition of Photoresistant and UV Polymerization under Vacuum of Polymethyl methacrylate
Advisors: E. Gulari and N. Yanumet
- Supawat Suranakapan** Processing of Thermoplastic Chitin Blends
Advisors: D. C. Martin, K. Trakulcoo and S. Chirachanchai
- Watanaporn Pornsiripong** Physical Characterization of Thermoplastic Chitin Blends
Advisors: D. C. Martin and K. Trakulcoo
- Sawitree Petchuay** Mechanical Properties of Thermoplastic Chitin Blends
Advisors: D. C. Martin and K. Trakulcoo
- Thupa Naiyawat** Microstructure of Thermoplastic Chitin Blends
Advisors: D. C. Martin and K. Trakulcoo
- Wanpen Tachaboonyakit** Chemical Modifications of Chitin
Advisors: D. C. Martin and S. Chirachanchai
- Surakit Chunharotrit** Chitin Derivative for Controlled Release System
Advisors: D. C. Martin and S. Chirachanchai
- Wittaya Lilayuthalert** Polyimide Clay Hybrid Thin Films
Advisors: J. Schwank, R. Magaraphan and A. Sirivat
- Walaiporn Prissanaroon** Preparation and Characterization of Conductive Polymer Films for Gas Sensor Applications
Advisors: J. Schwank and A. Sirivat
- Wirat Suttavineesan** Synthesis of Liquid Crystal Polymer directly from SO₂, Catechol, Hydroquinone and t-Butylcatechol via Oxide One Pot Process (OOPS) Synthesis
Advisors: R. M. Lane and S. Wongkasemjit

Research Facilities and Equipment

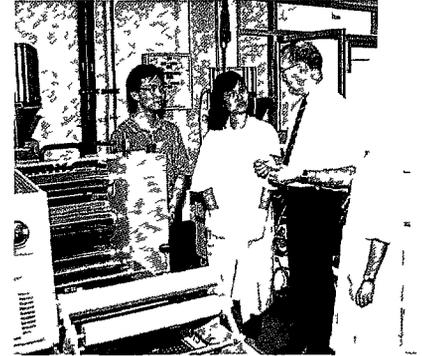
With a generous grant from the Royal Thai Government of 160 million baht the College embarked on an ambitious procurement program in order to establish the best, state of the art research laboratories in the Kingdom. This equipment has been divided between laboratories as follows:

Analytical Laboratory

GC/FT IR	Gas Chromatography (GC)
GC/MS Autospec	Ion Chromatography (IC)
GC/MS Quadrupole	KF Titrator
X ray Diffraction (XRD)	
Atomic Absorption Spectrophotometer (AAS)	
Gel Permeation Chromatography (GPC high temp)	
Gel Permeation Chromatography (GPC low temp)	
High Performance Liquid Chromatography (HPLC)	
UV VIS Spectrophotometer & Color Matching Equipment	

Polymer Testing Laboratory

Capillary Rheometer
Elmendorf Tear Tester
Gas Permeability Tester
Film Friction/Slip Tester
Rockwell Hardness Tester
Electrical Insulation Tester
Fiber/Film Shrinkage Tester
Brittleness Temperature Tester
Universal Testing Machine(Instron)
Universal Testing Machine(Lloyd)
Environmental Stress Cracking Tester
HDT/Vicat
Weatherometer
Abrasion Tester
Thickness Gauge
Pneumatic Punch
Salt Spray Tester
Haze Gloss Tester
Shore A,D Durometer
Melt Flow Index Tester
Pendulum Impact Tester



Polymer Processing Laboratory

Plasti Corder
Grinding Machine
Blown Film Extruder
Blow Moulding Machine
Injection Moulding Machine
Chill Roll Cast Film Machine
Pad Printer
Two Roll Mill
Twin Screw Extruder
Tube & Profile Extruder
Compression Presses (Wabash & Labtech)

Environmental Laboratory

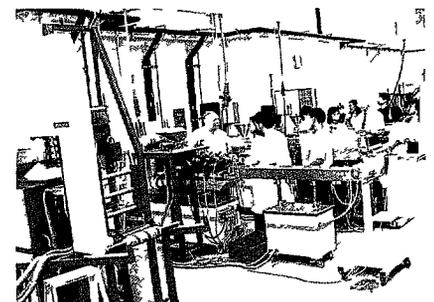
Ozone Generator
CO/CO₂ Analyzer
Ion Selective Meter
Zeta Potential Meter
Rapid BOD Analyzer
Oil Content Analyzer
Nitrogen Compound Analyzer
Total Organic Carbon Analyzer (TOC)
Incubator
Autoclave
Turbidimeter
COD Analyzer
Mercury Analyzer
Dissolved Oxygen Meter
Monometric BOD Analyzer

Petroleum Laboratory

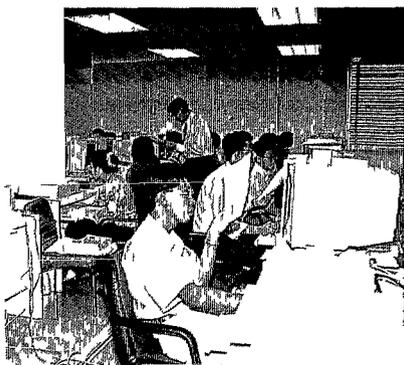
Elemental Analyzer
Bomb Calorimeter
Junkers Calorimeter
Distillation Apparatus
Cu/Ag Corrosion Bath
Kinematic Viscometer
Twin Column Adsorption Apparatus
Universal Penetrometer with Setamatic Controller
Ramsbottom Test Bath
Smoke Point Apparatus
Freezing Point Apparatus
Flash and Fire Point Tester
Combustion Exhaust Analyzer
Cloud and Pour Point Tester

Physico Measurement Laboratory

Surface Area Analyzer
Particle Size Analyzer
Dead Weight Tester
TPD/TPR Analyzer
Polarizing Microscope
Chemisorb (Quantachrome)
Spinning Drop Tensiometer
Dynamic Mechanical Analyzer
Differential Scanning Calorimeter DSC 200
Differential Scanning Calorimeter DSC 910S
Thermogravimetric Analyzer TG209
Thermogravimetric Analyzer TGA 2950
Rheometric Fluid Spectrometers (Solid, Liquid)
Microtome
Gas Flowrate Calibrator
Zoom Stereo Microscope
Scanning Probe Microscope
Tensiometer (Dunaury Ring)
Scanning Electron Microscope
Light Scattering Apparatus
Simultaneous Thermal Analyzer STA409



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Other Facilities

Computer Center

The College computer facilities are upgraded on a regular basis to respond to the needs of students, faculty members and staff.

Personal Computers and Printers

Following is the list of personal computers and printers installed at the College (units)

PC 386 type	11	PC 486 type	66
PC Pentium	41	MacIntosh	3
Dot Matrix Printers	13	Deskjet Printers	9
Laser Printers	24		

Local Area Network (LAN)

For improved efficiency in information communications within the College a LAN system has been installed at the Computer Center. There are 49 LAN terminals distributed throughout the various offices, laboratories and College library. The installation of fiber optic cables and associated equipment together with two file servers and various software programs was completed in 1996.

Chula Net Link

Access to the internet was made available by linking up the College's LAN system to the Chula Net. Facilities such as e-mail and ftp are available at each of the LAN terminals provided throughout the College.

Library and Information Center

The library provides facilities and resources to satisfy the varied needs of students and faculty members alike. In addition to textbooks and periodicals the library has a large range of video recordings of lectures and presentations conducted at the College.

As of June 30, 1997 the library holdings are

Books	1,343	TIS (Thai Industrial Standard)	1,080
Journals and Magazines	91	Theses	110
Company Profiles	120		
Video Recordings			
Lecture Courses	853	Seminars	85
Short Courses	83	Equipment Training	31

The cataloging of books and other resources has been computerized. Users can search from OPAC (On-line Public Access Catalog) system to retrieve information from CHULALINET network. On-line searches can also be made from CD ROM (ABI/Inform, DAO, SCI, Searchbank).

Audio Visual Center

The Audio Visual center has been set up to provide a wide range of facilities to assist students and faculty members with presentation materials and equipment. The resources available in the center include (sets)

Notebook PowerMc 5300 CE	1	Notebook Digital Ultra Hinote II	1
Scanners (slide and flatbed)	3	High Quality VDO Projector	1
Electronic Copy Board	1	Television (29 inch)	6
Video Cameras	3		
PC with Multimedia System Complete with Writeable CD ROM			1
Complete Set of Light and Sound Monitor and Controller			1

Funding

It is a recognized fact that adequate funding is indispensable to a successful graduate and research program in science and technology. In this respect the College has been very fortunate to receive funding from various sources to assist in its development at various stages. Three important sources are as follows:

UDLP Funding

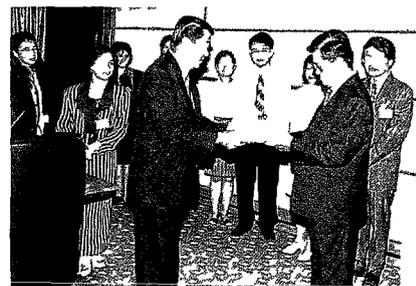
When the international academic partnership between the College and the three U.S. universities was established in 1992, the United States Agency for International Development (USAID), in recognition of the merits of the partnership, awarded the four partners a grant of one million US dollars from its University Development Linkages Project (UDLP) to assist in the startup of the collaborative venture. The grant was divided among the four partner institutes to use for the faculty and student exchange programs and program administration. The grant was to be used over a 5-year period from 1993 to 1997. By the end of this period in 1997, almost 100 students and over 10 Thai faculty members will have traveled to the three U.S. universities under the UDLP grant. The grant has helped the partnership to get off on a firm footing and today it has proved to be one of the most successful U.S. joint ventures supported by UDLP.

Student Scholarships

Student scholarships are important for the recruitment of top students. This is particularly true in the case of the College since the tuition fees for its international programs are much higher than those for other normal Thai programs. In this respect the College has received strong support from the industry in providing the necessary scholarships from the very beginning. The scholarships for M.S. students generally provide for the two-year tuition fee of 400,000 baht. Some scholarships, in addition to the 400,000 baht, give a monthly allowance of 120,000 baht over the 2-year period. There are two types of scholarship, bonding and non-bonding. The bonding scholarships usually require the recipient to work for 2-4 years for the sponsoring company on completion of their studies. In some cases the graduates go to work for their sponsor even though their scholarships are of the non-bonding type. Over the past 4 years as many as 22 companies and one agency have provided 95 scholarships amounting to 40 million baht to the graduate students in the International programs at the College. Their contributions have played a vital role in the success of the programs at the College. The names of the companies and agency donating the scholarships are listed below:

Companies and Agency Donating Scholarships

Bangkok Bank Public Co., Ltd
Bangpu Chemicals Co., Ltd
Banpu Public Co., Ltd
Caltex Oil (Thailand) Co., Ltd
Electricity Generating Authority of Thailand
Esso (Thailand) Public Co., Ltd
Eternal Petrochemical Co., Ltd
Lever Brothers (Thailand) Co., Ltd
National Petrochemical Public Co., Ltd
National Science and Technology Development Agency
National Starch and Chemical (Thailand) Ltd
Petroleum Authority of Thailand
Premier Group of Companies
Rayong Refinery Co., Ltd
Suramahas Co., Ltd
Thai Oil Co., Ltd



The Governor of the Petroleum Authority of Thailand donated scholarships for the College.



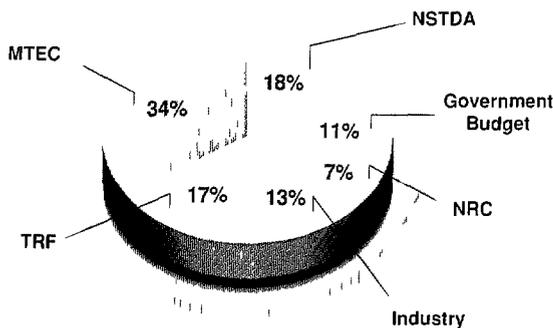
The Director of PTT Research Center donated research fund to the President of Chulalongkorn University

Thai Olefins Co , Ltd
 Thai Plastic and Chemicals Public Co Ltd
 The Bangchak Petroleum Public Co Ltd
 The Siam Cement Petrochemicals Group
 TOA Group of Companies
 Total Exploration and Production Thailand
 Tuntex (Thailand) Co , Ltd

Research Funding

Science and technology research programs involve considerable expenses. To support high quality science and technology graduate program entailing thesis requirements, a continuous supply of external funds for research work is indispensable. At the start of its international programs in 1993 the College had to rely mainly on internal funding from the University to finance its research projects. The funding received in that year amounted to only 574,300 baht. However, as the students' research work began to show results and more faculty members were recruited, the College was able to obtain funding from more diverse sources. The main sources were the National Research Council, the National Metal and Materials Technology Center and the recently formed Thailand Research Fund. Apart from these public organizations, the College has also received strong and increasing support from industry in terms of research funding. With these various sources the amount of research grants has increased considerably over the years with the amount expected to be over 10 million baht in 1997. This trend will help to ensure the self sustainability and continuity of high quality research programs at the College. Details of the amounts and sources of funds are shown in the following table.

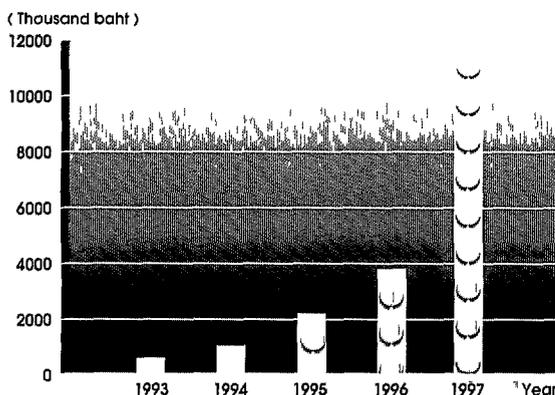
Sources of Research Grants 1997
 (Total Budget 12,050,400 baht)



Summary of Research Grants

Year	Source	Project Type	No of Projects	Budget (Baht)
1993	Government Budget	Faculty	3	574,300
1994	Government Budget	Faculty	4	818,000
1995	Government Budget	Faculty	4	701,400
	NRC	Graduate Student	17	510,000
	MTEC	Contract	4	1,053,270
	Total			2,264,670
1996	Government Budget	Faculty	5	1,096,900
	NRC	Graduate Student	18	720,000
	NRC	Faculty	4	1,085,500
	PTT	Thesis	6	904,610
Total			3,807,010	
1997	Government Budget	Faculty	4	1,290,000
	NRC	Graduate Student	22	880,000
	NSTDA	Ph D Grant	1	2,110,000
	Lever Brothers	Contract	1	108,000
	PTT	Contract	2	1,420,000
	TRF	Contract	1	1,992,000
MTEC	Contract	1	4,250,400	
Total			12,050,400	

Research Grants (1993-1997)



Proposed
 NRC National Research Council
 NSTDA National Science and Technology Development Agency
 PTT Petroleum Authority of Thailand
 TRF The Thailand Research Fund
 MTEC National Metal and Materials Technology Center

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Guest Speakers and Seminars

Professors from the U S partner universities generally give formal presentations of their current research activities carried out in their respective universities. In addition to the U S course professors the College has been privileged to serve as host to many other distinguished national and international speakers. These presentations are of immense benefit to the students, faculty members and public.

List of Seminars

1995

- July 6 **Dr Erdogan Gulari**
Department of Chemical Engineering, UM
CO Hydrogenation on Supported Ruthenium
Why We Have Not Been Able to Defeat the Schulz Flory Distribution
- July 17 **Dr Steven D Hudson**
Department of Macromolecular Science, CWRU
Novel Polymer Blend Morphologies and Interfacial Properties
- August 10 **Dr Tep Sastru**
Industrial Engineering Department, Texas A&M University
An Introduction to Statistical Process Control
- August 14 **Dr Richard M Lane**
Department of Materials Science and Engineering, UM
Chemicals, Polymers and Ceramics from the Beach
- August 17 **Dr Richard G Mallinson**
School of Chemical Engineering and Materials Science, OU
The Use of Natural Gas and Light Hydrocarbons as a Transportation Fuel
Problems and Solutions
- September 14 **Dr James O Wilkes**
Department of Chemical Engineering, UM
Computer in the Chemical Engineering Laboratory How They Can Help You
- September 29 **Dr Erdogan Gulari**
Department of Chemical Engineering, UM
Equilibrium Extraction and Concentration of Multivalent Metal Ions and
Proteins by Using Microemulsions
- October 12 **Dr Steve Thompson**
University of New Brunswick, Canada
Energy and the Environment
- October 30 **Mr John D Morton**
University of Michigan, U S A
Environmentally Sustainable Development Concepts and Applications in Thailand
- November 23 **Dr Johannes Schwank**
Department of Chemical Engineering, UM
Microelectronic Gas Sensors
- November 28 **Dr G A Holder**
Department of Chemical Engineering, Monash University, Australia
The Use of Polymeric Additives to Improve the Flow of Oils

1996

- January 22 **Dr Ica Manas Zloczower**
Department of Macromolecular Science, CWRU
Analysis of Mixing Efficiency in Polymer Processing Equipment through
Simulation
- March 5 **Dr Kuchi Takemoto**
Department of Materials Chemistry, Ryukoku University, Japan
Material Biology New Topics in Functional Polymer Chemistry
- March 27 **Dr Pramote Chaiyavech**
National Petrochemical Public Co , Ltd
The Petrochemical Industry in the Year 2000

- April 24 **Dr Waraphat Arthayukti**
Unocal Thailand Co Ltd
Natural Gas Production and Utilization
- April 25 **Dr Wirat Sakornwimon**
Bangkok Synthetics Co Ltd
Petrochemical from Mixed C₄
- May 2 **Dr Pramote Chayavech**
National Petrochemical Public Co Ltd
Petrochemical Industry
- May 7 **Mr Parut Chatikavanij**
Esso (Thailand) Public Co Ltd
Petroleum Industry
- May 8 **Mr Lek Kulapaditharom**
Thai Olefins Co Ltd
Olefin Plants
- May 8 **Dr Thevarak Rochanapruk**
Thai Plastic and Chemicals Public Co Ltd
PVC Production
- May 16 **Mr Achille E Riviello**
University of Oklahoma U S A
Surface Chemical Mechanisms of Flotation
- May 30 **Dr Hatsuo Ishida**
Department of Macromolecular Science CWRU
New Compatibilization Technique of Immiscible Blends by Surface Treated Fillers
- May 30 **Dr Christopher Scott**
Massachusetts Institute of Technology U S A
Morphology Development During Processing of Immiscible Polymer Blends
- June 6 **Dr Brice Carnahan**
Department of Chemical Engineering UM
A Multirate Parallel Modular Algorithm for Dynamic Chemical Process
Simulation on Distributed Memory Multicomputers
- June 17 **Dr Enrico Traversa**
Dipartimento di Scienze e Tecnologie Chimiche
Universita di Roma Italy
Novel Sensing Mechanisms for Ceramic Humidity Sensors
- July 9 **Dr Alexander M Jamieson**
Department of Macromolecular Science CWRU
Dynamic Light Scattering Studies of Liquid Crystal Polymers in Nematic Solvents
- July 10 **Dr James O Wilkes**
Department of Chemical Engineering, UM
Surface Tension Driven Flows of Paint Films
- July 16 **Dr Santi Kulprathipanja**
UOP Co Ltd U S A
Industrial Separation Technology
- August 6 **Dr David C Martin**
Department of Materials Science and Engineering UM
Thermally Crosslinkable Flame Resistant Copolymers
- August 22 **Dr Lance L Lobban**
School of Chemical Engineering and Materials Science OU
Low Temperature Methane Conversion Using Electric Discharges
- September 16 **Dr Erdogan Gulari**
Department of Chemical Engineering UM
Polyolefin Synthesis Catalysis
- October 2 **Dr H Scott Fogler**
Department of Chemical Engineering, UM
Kinetics of Silica Particle Formation in Nonionic W/O Microemulsions from
Tetraethyl Orthosilicate

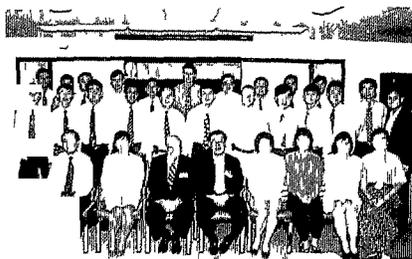
December 27 **Dr Ralph T Yang**
Department of Chemical Engineering UM
New Adsorbents for Gas Separation by Chemical Complexation and Electron
Microscopy Studies of Gas Carbon Reactions

1997

- January 13 **Dr John F Scamehorn**
School of Chemical Engineering and Materials Science, OU
Removal of Dissolved Pollutants from Water Using Colloid Enhanced
Ultrafiltration Techniques
- January 16 **Dr Jules J C Picot**
University of New Brunswick, Canada
Polymer, Orientation and Processing
- February 5 **Dr Mahka J Punyagupta**
Lever Brothers (Thailand) Co , Ltd
Polymer as Rheology Modifiers in Consumer Products
- February 12 **Dr Carlos Tu**
Department of Chemical Engineering, Monash University, Australia
Steady and Dynamic Rheology of a Thermotropic Liquid Crystalline Polymer
and its Blends
- April 9 **Dr Wirojana Tantraporn**
Premier Group of Companies
The Role of Research and Development in the Future of Thai Industries
- April 11 **Mr Tom Loughney**
The Dow Chemical Company, U S A
Development, Properties and Applications of Disulfonate Surfactants (Dowfax)
- April 23 **Dr Wirat Sakornwimon**
Bangkok Synthetics Co , Ltd
Petrochemical from Mixed C₄
- April 23 **Dr Waraphat Arthayukti**
Unocal Thailand Co , Ltd
Natural Gas
- April 24 **Dr Pramote Chairavech**
National Petrochemical Public Co , Ltd
Petrochemical Industry
- April 30 **Mr Parut Chatikavanij**
Esso (Thailand) Public Co Ltd
Petroleum Industry
- May 7 **Mr Lek Kulapaditharom**
Thai Olefins Co Ltd
Olefin Plants
- May 7 **Dr Thevarak Rochanapruk**
Thai Plastic and Chemicals Public Co Ltd
PVC Production
- May 29 **Dr James O Wilkes**
Department of Chemical Engineering UM
Water flooding in Stratified Oil Reservoirs
- June 4 **Dr Hatsuo Ishida**
Department of Macromolecular Science, CWRU
A New Class of Phenolic Resins with Superb Balance of Mechanical and Physical
Properties Ideal Combination of Phenolic, Epoxy and Polyimide Resins
- July 10 **Dr John F Scamehorn**
School of Chemical Engineering and Materials Science OU
Denking of Water Based Ink Printings from Plastic Film using Detergents
- July 16 **Dr Alexander M Jameson**
Department of Macromolecular Science, CWRU
Direct Determination of Free Volume in Amorphous Polymers by Positron
Annihilation Lifetime Spectroscopy



Industrial Short Courses



Short course on Petrochemical and Polymer Industries

The College conducts on average one industrial oriented short course per month. These courses have proved to be extremely popular with local industrialists and have helped to forge close ties between the University and industry. The courses are presented by experienced local and overseas lecturers who have intimate first hand knowledge of the relevant industries. About 350 staff members from 200 companies attend short courses at the College each year.

List of Short Courses

1995

- July 5 6 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Processing and Testing
- July 26 28 **Dr Tep Sastru and Dr Vira Chankong**
Texas A&M and Case Western Reserve University, U S A
Practical Methods for Quality Improvement
- August 16 17 **Mr John W Ellis**
The Petroleum and Petrochemical College
Injection Moulding Technology
- November 15 17 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Testing
- December 13 14 **Dr H Scott Fogler**
University of Michigan, U S A
Strategies for Creative Problem Solving

1996

- January 24 25 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Processing and Testing
- February 7 9 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Compounding, Processing and Testing
- March 12 14 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Compounding, Processing and Testing
- March 20 21 **Dr Witold Brostow**
The University of North Texas, U S A
Mechanical Properties and Reliability of Polymeric Materials
- May 8 10 **Dr Harold A Wittcoff**
Chem Systems Inc U S A
The Petrochemical and Polymer Industries Technology and Economics
- May 13 15 **Dr Vira Chankong**
Case Western Reserve University, U S A
Computer based Tools for Managers and Engineers
- May 22 23 **Mr John W Ellis**
The Petroleum and Petrochemical College
Injection Mould Design
- July 23 25 **Dr Jeffrey H Harwell and Dr John F Scamehorn**
University of Oklahoma U S A
Applied Surfactant Science and Technology

- August 26 28 **Dr Lance L Lobban and Dr Richard G Mallinson**
University of Oklahoma, U S A
Heterogeneous Catalysis Fundamentals Industrial Applications and Frontiers
- September 18 19 **Mr John W Ellis**
The Petroleum and Petrochemical College
Blow Moulding Technology
- October 8 10 **Dr Frank R Steward, Mr David H Cameron and Mr Blair Kennedy**
University of New Brunswick, Neil and Gunthers Inc and NB Power Canada
Cogeneration and Combined Cycles More Efficient Use of Energy in Thailand
- November 12 14 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Compounding, Processing and Testing
- 1997**
- January 8 10 **Dr Tep Sastri and Dr Vira Chankong**
Texas A&M and Case Western Reserve University, U S A
Process Improvement and Quality Assurance
- January 29 30 **Mr John W Ellis**
The Petroleum and Petrochemical College
Compression and Transfer Moulding
- February 17 19 **Dr Harold A Wittcoff**
Chem Systems Inc U S A
The Petrochemical and Polymer Industries Technology and Economics
- May 14 16 **Dr Tep Sastri**
Texas A&M University, U S A
Process Quality Monitoring and Improvement
- June 18 20 **Dr Jeffrey H Harwell, Dr John F Scamehorn and Dr Sherril D Christian**
University of Oklahoma, U S A
Applied Surfactant Science and Technology
- July 23 25 **Dr Vira Chankong**
Case Western Reserve University, U S A
Computer based Tools for Managers and Engineers
- August 6 7 **Mr John W Ellis**
The Petroleum and Petrochemical College
Plastics Materials, Processing and Testing
- November 17 21 **Dr Amit Chakma**
University of Regina, Canada
Natural Gas Processing
- December 11 12 **Dr Harold A Wittcoff**
Chem Systems Inc , U S A
The Petrochemical and Polymer Industries Technology and Economics



Short course on Cogeneration and Combined Cycles More Efficient Use of Energy in Thailand

Collaboration with Industry



Analytical and Testing Services

With the procurement of a wide range of sophisticated analytical and testing equipment the College has been able to establish a center for the analysis and testing of materials. The Center which is available to the general public has carried out a variety of determinations such as chemical analysis, plastics testing, effluent analysis, and the testing and analysis of petroleum products.

Research Cooperation

Industrial companies, in the knowledge that they will have available a valuable and continuous source of employable graduates coming from the programs, have been enthusiastic in their desire to contribute to the development of the programs. Many organizations have been extremely generous in providing scholarships and research funds for a number of students.

Several companies such as Petroleum Authority of Thailand, National Petrochemical Public Co., Ltd., Thai Polyethylene Co., Ltd., and Lever Brothers, have proposed a variety of industrial research projects for the students to work on as part of their course program. This type of applied research is beneficial to the students in terms of providing relevancy to their research work.

During the month long stay at the College the U.S. professors usually make one or more visits to industrial companies in order to become acquainted with the companies, impart technical knowledge and expertise, and often to suggest solutions to any problems that the companies may be experiencing. Occasionally, topics for student research projects are initiated during these industrial visits. When such research projects are undertaken the company representative will provide a suitable person to act as co-advisor for the project.

Student research projects, especially in the field of applied research, generally require the use of special chemicals, resins, fillers, etc. Industrial companies have shown extreme willingness to supply the students with such materials at their disposal invariable at cost free in the form of a donation to the College.

Other Activities

In parallel with the formal student courses the College has run a series of very successful short courses for companies and individuals. The courses are industrial oriented and provide a rare opportunity for the participants to meet one another and discuss matters of mutual interest. In addition, specific short courses have been conducted for individual companies upon request.

The College has received very good cooperation in obtaining the services of many local industrialists to impart their knowledge and experience to students in the form of lectures and seminars. Such presentations give the students valuable insights into the "real world" which they will be entering on completion of their studies.

To maintain close contact with the industry, the College faculty make regular visits to industrial plants and companies to share knowledge and discuss possible collaboration. Students often join in these visits to gain first hand experience of industrial operations which will be valuable both for their academic work and their later working career.

Visitors to the College

Since its inception the College has had a constant stream of local and overseas visitors wishing to observe and learn about the unique system of graduate education initiated by the College. Visitors are invariably impressed by the system of instruction adopted and with the excellent laboratory and research facilities available to the students. More than one overseas visitor regard the College system as a model to be emulated in their home countries.

List of Guests Visiting the College (July 95 - June 97)

Prof Derek H Lister

Professor (Chemical Engineering Department) The University of New Brunswick, Canada

Dr Traversa Enrico

Dipartimento di Scienze e Tecnologie Chimiche Università di Roma Tor Vergata,
Via della Ricerca Scientifica Italy

Mr Max K Crummins, Mr Graham Hewlett, and Mr Michael Dundon

Experts in Plastics Technology Australia

Prof James L White

Head Department of Polymer Engineering University of Akron, U S A

Prof Elizabeth Parr Johnston

President of the University of New Brunswick Canada

Students and Faculty Members of Rubber and Polymer Technology Department

Prince of Songkla University

Mr C S Lewis, III

Regent of the University of Oklahoma U S A

Ms Helen L McRae

Director Environmental Systems Groups, Massachusetts Institute of Technology, U S A

Assoc Prof Alan Holder

Department of Chemical Engineering, Monash University, Australia

Dr Scott G Delcourt

Director of Graduate Admissions University of Maine U S A

Dr Thomas R Moebus

Director Office of Corporate Relations Massachusetts Institute of Technology, U S A

Prof Ralph T Yang

Chairman Department of Chemical Engineering University of Michigan, U S A

Mr Tom Loughney

Project Manager Specialty Chemicals The Dow Chemical Company U S A

Prof Senchi Tokura

Dean Graduate School of Environmental Earth Science Hokkaido University, Japan

Managing Director and Staff

Poranunt Co Ltd Bangkok

Executive Director and Staff

Research & Development Center, Petroleum Authority of Thailand

Dr Chris E Scott

Department of Materials Science and Engineering Massachusetts Institute of Technology, U S A

Prof James T Hsu

Director Biopharmaceutical Technology Institute
Department of Chemical Engineering Lehigh University, U S A

Dr Jules J C Picot

Professor Chemical Engineering Department University of New Brunswick, Canada

Prof Witold Brostow

Materials Science University of North Texas, U S A

Prof Mai Thanh Tan

Dean of Petroleum Faculty Hanoi University of Mining and Geology, Vietnam

Chief Officer and Staff

Office of the Army Research and Development Coordination Ministry of Defence



M O U signing - C
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Visitors from Ministry of Defence