

SPARK

CHEMICAL DEPARTMENT NEWSLETTER

EDITION 9

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Super critical fluids

This year marks the 50th anniversary of the first patent describing the use of supercritical fluid extraction by Kurt Zosel, Max Planck Institute for Coal Research, Mülheim an der Ruhr, Germany. It also marks the 40th anniversary of Zosel's US patent of the use of supercritical fluid extraction in the decaffeination of coffee.



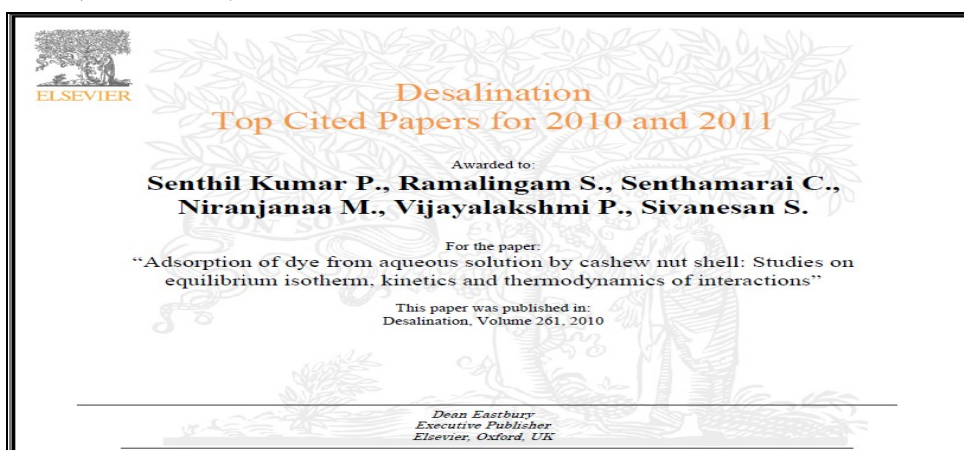
Supercritical fluid extraction utilizes a gas that has been pressurized and heated beyond its critical points so that it becomes a supercritical fluid (SCF). At the critical point, the substance can exist as a vapour and liquid in equilibrium.

SCFs have low viscosities and no surface tension, which means they are capable of effusing through solids, similar to a gas. Once the SCF has penetrated the pores of the solid, it can selectively dissolve substances contained within the solid, similar to a liquid. The dissolved substances are then carried out of the solid in the SCF and can be recovered through depressurizing the SCF so that it returns to the gas phase, depositing the extracted substance. This results in little or no solvent residues contaminating the extracted product. The gas can then be returned to the SCF phase and reused.

An additional advantage of SCF extraction is the speed at which the extraction can be performed due to the higher diffusivities and lower viscosities of SCFs compared with liquids. The technique has been applied in the food industry to remove fats and oils from vegetable and animal matter, such as cocoa butter from cocoa beans, soybean oil from soybeans, and essential oils from spices. In the decaffeination of coffee, the caffeine was extracted from green coffee beans with supercritical CO₂. This process can selectively reduce the amount of caffeine from 3 % to 0.02 % without removing any of the substances that contribute to the aroma formed on roasting. Presently, the SCF extraction technique is most widely used in many food, pharmaceutical, and chemical industries.

Faculty Activities

- **Prof. K. Ramakrishnan**, Head of the Department, attended ISTE lecture on “Role of Humanities subjects in Engineering” on 13th Aug 2013.
- **Dr. K. P. Gopinath** participated in Patti Mandram and **Dr. R Saravananthamizhan** and **Mr. Kilaru Harsha Vardhan**, participated in quiz in the **Teachers’ Day celebration** at SSN Main Auditorium on 13th Aug 2013.
- **Dr. D. Gnana Prakash** attended faculty development programme sponsored by TEQIP on “Recent Design Concept of Heat Transfer Equipment in Refineries, Fertilizers and Allied Industries” organized by the Department of Chemical Engineering, CIT, Coimbatore on 17th Aug 2013.
- **Dr. D. Gnana Prakash** and **Mr. A Seenivasan**, Assistant Professor attended national level workshop on Carbon Capture Sequestration and Utilization conducted by Department of Chemical Engineering, St. Joseph’s College of Engineering, Chennai from 22nd-23rd Aug 2013.
- **Dr. P. Senthil Kumar** received an award from Elsevier for the **Top Cited Article** in the year 2010 and 2011. Article Name: “Adsorption of dye from aqueous solution by cashew nut shell: Studies on equilibrium isotherm kinetics and thermodynamics of interactions”, Desalination, 261, 52-60, 2010 Co-Authors: Ramalingam S, Senthamarai C, Niranjanaa M, Vijayalakshmi P, Sivanesan S. (IF: 3.041).



Faculty Activities

- **Dr. P. Senthil Kumar** submitted a project proposal titled “Conversion of waste plastics into fuel oils with vacuum controlled system in a novel catalytic cracking reactor and activated carbon produced from agricultural waste act as a catalyst: Effective utilization of waste plastic and agricultural wastes in India: in the broad subject area of Chemical Science under the scheme of DST Fast Tract – Young Scientists on 28th Aug 2013.
- **Dr. K. Sathish Kumar** conducted Doctoral Committee meeting for his Ph. D. (Part time) candidate Mrs. Anitha, Assistant Professor, Rajalakshmi College of Engineering. Dr. Selvaraj Professor, doctoral committee member from Anna University interacted with the scholar on 04th Sep 2013.
- **Dr. K. Sathish Kumar** published a paper titled “The Effect of Gold and Iron-Oxide Nanoparticles on Biofilm-Forming Pathogens” ISRN Microbiology, 2013, Article ID 272086, 5 pages, <http://dx.doi.org/10.1155/2013/272086>.
- **Dr. K. Sathish Kumar**, Associate Professor, submitted a research proposal to DBT, New Delhi- “Effect of Gold Nanoparticles for the delivery of Gene and Drug to Cancer cell” on 04th Sep 2013.
- **Dr. P. Senthil Kumar**, Associate Professor applied for MNRE Conference grant on 04th Sep 2013.



Faculty Activities

- **Dr. K. P. Gopinath** attended and served as a Chair Person for technical session in National Level Seminar cum Conference on “Applications of Bioremediation Techniques for Green Environment”, held at Karpaga Vinayaka College of Engineering and Technology Chennai on 06th Sep 2013.
- **Mr. Kilaru Harsha Vardhan** delivered a Ph. D. research seminar presentation on Adaptive control of reactor – separator column at CLRI, Chennai on 12th Sep 2013.
- **Dr. R. Saravanathamizhan** submitted a project proposal to Tamilnadu State Council for Science and Technology under the Science and Technology Project Scheme on 10th Oct 2013.
- **Dr. P. Senthil Kumar** have published a paper in the title of “A new electrode reactor with in-built recirculation made for the enhancement of methylene blue dye removal from the aqueous solution comparison of adsorption, electrolysis and combined effect” with **S. Maria Jacob Stani Raja, Mahatheven, L Dinesh Kumar** and **C. Prabhakaran** in Korean journal of Chemical Engineering (IF:1.059) on 11th Oct 2013.
- **Dr. K. Ramakrishnan**, Professor and **Dr. K P Gopinath**, Associate Professor visited and studied “Biomethanation plant from food waste” at Mahabalipuram for our college proposed project 16th Oct 2013.
- **Mr. A. Seenivasan**, Assistant Professor appeared for Ph. D. viva-voce examination at IIT Madras on 17th Oct 2013.

Faculty Activities

- **Dr. D. Gnana Prakash** and **Dr. R Saravanathamizhan** submitted a FDP – proposal to ISTE Punjab University on the topic “Recent Advancement in Energy Generation and Storage” on 24th Oct 2013.
- **Dr. P. Senthil Kumar**, Department of Chemical Engineering and **Dr. R Prakash**, Department of Mechanical Engineering submitted a project proposal to Ministry of Environment & Forest on the title of “A feasibility study on the production of low emissive liquid fuels from waste plastics by using novel reactor and its management system in India: An experimental investigation on a diesel engine” on 25th Oct 2013.
- **Dr. K. Sathish Kumar** submitted a project proposal to the Ministry of Environment & Forest on the title “Formulation and Investigation of 6 – TG Nanoparticles with factorial design based studies” on 28th Oct 2013.
- **Dr. R. Saravanathamizhan** submitted a project proposal to the Ministry of Environment and Forest on the title “Photoelectric Chemical Conversion of CO₂ into Hydrocarbon Fuel” on 28th Oct 2013.
- **Dr. P. Senthil Kumar** submitted a project proposal to the Ministry of Environment and Forest on the title of “Selective removal of toxic heavy metal ions from the water / waste water using novel adsorbent: Environmental Health and Technology” on 28th Oct 2013.

Student Activities

- **Sankaranarayanan A.R.** and **Pradeep Kumar T.** won the **FIRST PLACE** in technical quiz at Pansophy'13 organized by Sri Venkateswara College of Engineering on 24th Aug 2013.
- **Sai Madhusudanan A.B.** and **Pradeep Panneerselvam** won the **SECOND PLACE** in Poster Presentation at Pansophy'13 organized by Sri Venkateswara College of Engineering on 24th Aug 2013.
- **Karthik J.** delivered a talk on Novel techniques of desalination of sea water in I-Cell lecture series on 02th Sep 2013.
- **Jyotsna R., Malavika R., Neeha Dev A., Raksha M., Abhishek Dutta, Abhishek S.N.** attended special lecture by PALS-2013 (PAN IIT Alumini Leadership Series) at Rajalakshmi College of Engineering Chennai on 06th Sep 2013.
- All the students of III year attended a special lecture by **Mr. Tom Anfuso**, Vice president, Business Systems, U.S.A. at mini auditorium on 19th Sep 2013.
- **Pradeep Panneerselvam** and **Sai Madhusudanan A.B.** won the **Best Paper Award** in "National Conference on Fundamental and Applied Chemistry" under the guidance of **Dr. K. Sathish Kumar** along with **K. Rajasekaran** and their paper entitled "Comparative Drug Release Studies of 5-fluororacil and 6-thioguanine entrapped on PLA-co-PEG/Gold Nanocapsules" was published in *Chemical Science Review and Letters* (ISSN 2278-6783) on 04th Oct 2013.
- **Yeswanth R.** participated in **CAPE - 2013**, held at **SASTRA**, Tanjore and won **FIRST PLACE** in paper presentation on "*Adsorption of methylene blue dye onto raw and surface modified mango seed kernel powder*" on 18th Oct 2013.

Student Activities

- **Koushik Balaji** was a FINALIST in the Aarush'13 Ambassador Programme in a national level techno-management fest at SRM University during 18th to 21th Sep 2013.
- **Lalith Kumar S.** attended 14th EC meeting of IChE-CRC at IChE Centre, Chennai and interacted with industrialists about the opportunities for Chemical Engineers on 28th Sep 2013.

SSN Scholarships Awardees

- Santhip Prabhu S
- Rakesh G
- Anitha Venkat
- Saleem R
- Vinoth B
- Manimegalai M
- Sai Deepthi ASL
- Prathima Raje BM
- Bharath Kumar I
- Vandana G
- Prabhakaran C

- Priya R
- Sharmila S
- Karthik J
- Kamaraj D
- Divya A
- Jyotsana R
- Raksha M
- Shiva Subramanian J
- Chevandi M
- Manoj M

Chemiczna 2k13



The chemical department national students' symposium CHEMICZNA 2k13 was conducted on 31, August, 2013. Over 500 student delegates from various colleges across India travelled to SSN to participate in the various technical and non technical events. The events were well planned by the students and were conducted meticulously.

The day started with a grand inauguration at the Main Auditorium. The function was presided over by **Shri C. Natarajan**, Deputy General Manager of ONGC who gave the inaugural address. The technical events like Paper Presentation, Poster Presentation, Working Model, Technical Quiz and What Went Wrong received good response and participation with enthusiasm. Non technical events like Mintue-To-Win-It, Movie Quiz and Gaming attracted a large crowd and were fun-filled.



The day saw great talent and intellectual minds. Prizes worth Rs 65000 were distributed to students with scientific ideas and research potential. The successful day was wrapped up with the prize distribution ceremony at the main auditorium.

Department Highlights

- **National Conference on Advancements in Adsorption Science and Technology** : Prof. K. Ramakrishnan, HOD, convened the conference that was coordinated by Dr. P. Senthil Kumar and Dr. K. P. Gopinath on 02nd Aug 2013. About 50 participants from all over Tamil Nadu participated and 20 papers were presented.
- **Hands on Training in Heavy Metal Analysis: Atomic Absorption Spectroscopy** : Dr. P. Senthil Kumar and Dr. K. P. Gopinath organized this one day National Workshop held on 08th Aug 2013. Dr. P Senthil Kumar gave a presentation on the fundamentals of AAS to the participants.
- **I-Cell National Conference on Recent Trends in Chemical, Energy and Environmental Engineering** : Dr. P. Senthil Kumar was the coordinator of the conference held on 26th Sep 2013. Dr. K. P. Gopinath, presented a talk on 'Algal Bio-Diesel'. More than 30 participants presented their research papers.
- **National Level conference on Nano Bio-technology** : Dr. K. Sathish Kumar, and Dr. R. Saravanathamizhan organized this one day conference on 04th Oct 2013. It was well received by research scholars and students.
- **Association of Chemical Engineering Lecture series:**
 - **Sri Nakeeran, ProCAE**, Chennai delivered a special talk on "CFD Simulation Techniques". He explored the current challenges faced by the industries and also explained about the application of CFD on solving those problems on 11th Sep 2013.
 - **Dr. Ganapathy Venkata Subramanian**, Professor, Dept of Environmental Science, Anna University, delivered a lecture on 'Environmental Laws' on 25th Sep 2013.

SSN Internal Project Funding

Twelve projects were presented on various topics from our department.

Students	Faculty Guide
Sankaranarayanan AR Vignesh R	Dr. K. Ramakrishnan
Suchithra B Nandhini M	Dr. R. Saravanathamizhan Dr. D. Gnana Prakash
Sai Madhusudanan Pritham A Pradeep P	Dr. K. Sathish Kumar
Priyadarshini B Gayathri R	Dr. R. Pushpalatha
Preeti R Sharmila S Bhavana G	Dr. P. Senthil Kumar
Namratha N Monica V	Dr. P. Senthil Kumar
Sai Deepti ASL Bharani R	Dr. P. Senthil Kumar
Eswar S Bharath Kumar I	Dr. K. P. Gopinath
Karthik M Abishek S	Dr A. Seenivasan

The department congratulates the students and the faculty members!!

Placements

The department of chemical engineering congratulates the following students on getting placed !!

ITC Ltd MU SIGMA THE ELITISTS

Prya Krit K Sai
Deepti ASL

Eswar Bharadwaj
Janani S

Nivedha S

INFOSYS

Aditya V
Bharani R
Ganesh Karthik
Geetha Manjari S
Ineya R
Sharath Rajulu BE
Sivaranjanee R
Swaminathan R

CTS

Anita Venkat
Deepika N
Neeraja K
Sangeetha P R
Thamizh Vaanan T

WIPRO

Karthik A
Vinothini U

EDITORIAL TEAM

STUDENTS

Priyadarshini B

Pradeep P

Santhana Krishnan V

Poornima M

Suchithra B

FACULTY INCHARGE

Dr. A. Seenivasan

Dr. K. Ramakrishnan

Coming up...

International Conference on Recent Advancement
in Chemical, Environmental and Energy Engineering

RACEEE-2014 on 27th and 28th February, 2014 !!!

Web page: <http://www.raceee2014.com/>