



NCL Academy

- A project of the Venture Center -

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Course announcement

Structural Characterization Using Rheology and Small Angle Scattering

Course Director: *Dr. K. Guruswamy*, Scientist, NCL, Pune
Dates: 26-28 November 2008
Venue: NCL Innovation Park, Pune, India

Organizers



VENTURE CENTER

NCL Innovation Park, Pune, India

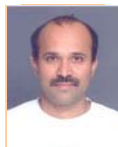
Course goals and summary:

- This course is aimed at giving practicing industry scientists hands-on exposure to structural characterization of soft materials, viz. polymers, colloids, dispersions, etc. using rheology and static and dynamic light scattering and small angle X-ray scattering.
- The course combines lectures describing basic concepts, case-studies describing data treatment and analysis and hands-on sessions in the laboratory on various rheometers (shear and capillary rheometers from different manufacturers), light and small angle X-ray scattering equipments.
- Course materials will include a CD with lecture slides and software macros for data processing and analysis from the case studies. Participants will also receive a certificate of participation at the end of the course. At the end of this course, we propose to create an online community of users of these experimental techniques to facilitate technical exchanges.
- Enrolment in the course is limited to ensure close interaction between the expert instructors and the participants, and since only limited numbers can be accommodated in the laboratory sessions.

Course schedule

| Date | Time | Topic | Venue | Instructor |
|--------------------|-------------|---|--|------------------|
| Day 1 | | | | |
| 26 Nov 2008 | | | | |
| | 0830 – 0930 | Introduction to Course, Instructors Microstructure via Rheology and Scattering (Course Outline) | Training Room NIP | Dr. K. Guruswamy |
| | 0930 – 1100 | Rheology – Session 1 <i>Subject: Basics of rheology</i> | Training Room NIP | Dr. A. K. Lele |
| | 1100 – 1130 | Tea | Training Room NIP | |
| | 1130 – 1300 | SAXS – Session 1 <i>Subject: Basics of SAXS</i> | Training Room NIP | Dr. K. Guruswamy |
| | 1300 – 1400 | Lunch | Training Room NIP | |
| | 1400 – 1530 | Light Scattering – Session 1 <i>Subject: Basics of Light scattering</i> | Training Room NIP | Dr. S. K. Bhat |
| | 1530 – 1600 | Tea | NCL Innovation Park | |
| | 1600 - 1800 | Group 1: Controlled strain rheometer | NCL ,Lab No 918 | |
| | | Group 2: Controlled stress rheometer | NCL ,Lab No 918 | |
| | | Group 3: Capillary rheometer | NCL,Polymer Processing center | |
| | | Group 4: 2D SAXS | NCL , Polyolefin Lab | |
| | | Group 5: Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 6: 3D - Dynamic light scattering | NCL , Basement lab 2 | |
| Day 2 | | | | |
| 27 Nov 2008 | | | | |
| | 0830 – 1030 | Rheology – Session 2 <i>Subject: Case Studies</i> | Training Room NIP | Dr. A. K. Lele |
| | 1030 – 1100 | Tea | Training Room NIP | |
| | 1100 - 1300 | Group 1: Controlled stress rheometer | NCL ,Lab No 918 | |
| | | Group 2: Capillary rheometer | NCL,Polymer Processing center | |
| | | Group 3: 2D SAXS | NCL , Polyolefin Lab | |
| | | Group 4: Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 5: 3D - Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 6: Controlled strain rheometer | NCL ,Lab No 918 | |
| | 1300 – 1400 | Lunch | NCL, 3 rd floor Conference Room | |
| | 1400 - 1600 | Group 1: Capillary rheometer | NCL,Polymer Processing center | |
| | | Group 2: 2D SAXS | NCL , Polyolefin Lab | |
| | | Group 3: Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 4: 3D - Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 5: Controlled strain rheometer | NCL ,Lab No 918 | |
| | | Group 6: Controlled stress rheometer | NCL ,Lab No 918 | |
| | 1600 – 1630 | Tea | NCL, Behind CE LH | |
| | 1630 - 1830 | Group 1: 2D SAXS | NCL , Polyolefin Lab | |
| | | Group 2: Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 3: 3D - Dynamic light scattering | NCL , Basement lab 2 | |
| | | Group 4: Controlled strain rheometer | NCL ,Lab No 918 | |
| | | Group 5: Controlled stress rheometer | NCL ,Lab No 918 | |
| | | Group 6: Capillary rheometer | NCL,Polymer Processing center | |
| Day 3 | | | | |
| 28 Nov 2008 | | | | |
| | 0830 – 1030 | Light Scattering – Session 2 <i>Subject: Case Studies</i> | Training Room NIP | Dr. S. K. Bhat |
| | 1030 – 1045 | Tea | NCL Innovation Park | |
| | 1045 – 1245 | SAXS – Session 2 <i>Subject: Case Studies</i> | Training Room NIP | Dr. K. Guruswamy |
| | 1245 – 1345 | Lunch | NCL, 3 rd floor Conference Room | |
| | 1315 - 1545 | Group 1: Dynamic light scattering | NCL, Basement lab 2 | |
| | | Group 2: 3D - Dynamic light scattering | NCL, Basement lab 2 | |
| | | Group 3: Controlled strain rheometer | NCL ,Lab No 918 | |
| | | Group 4: Controlled stress rheometer | NCL ,Lab No 918 | |
| | | Group 5: Capillary rheometer | NCL,Polymer Processing center | |
| | | Group 6: 2D SAXS | NCL , Polyolefin Lab | |
| | 1545 - 1600 | Tea | NCL, Behind CE LH | |
| | 1600 - 1800 | Group 1: 3D - Dynamic light scattering | NCL, Basement lab 2 | |
| | | Group 2: Controlled strain rheometer | NCL ,Lab No 918 | |
| | | Group 3: Controlled stress rheometer | NCL ,Lab No 918 | |
| | | Group 4: Capillary rheometer | NCL,Polymer Processing center | |
| | | Group 5: 2D SAXS | NCL , Polyolefin Lab | |
| | | Group 6: Dynamic light scattering | NCL, Basement lab 2 | |
| | 1800 – 1830 | Course Summary/Evaluation; Distribution of Certificates | Training Room NIP | |

Instructors



Guruswamy Kumaraswamy (Course Director)
Scientist, National Chemical Laboratory, Pune

- Ph.D., Chem. Engg., California Institute of Technology, USA, 2000.
 - B.Tech., Chem. Engg., Indian Institute of Technology, Bombay, 1994.
- 2001-current: Expertise in structure-property relations in polymers and colloids, rheology, rheo-optics, scattering, microscopy. Actively involved in technology development projects for industry and training programs.
- Landau Award for Outstanding Performance (Caltech, 1995-1998)
 - CSIR Young Scientist Award (2005)



Ashish K. Lele
Scientist, National Chemical Laboratory, Pune

- Ph.D., Chem. Engg., University of Delaware, USA, 1993.
 - B.Tech., Chem. Engg., UDCT, Mumbai, 1988.
- 1993-present: Leading industrial sponsored research projects at NCL; driving product development activities; engaged in fundamental research on rheology of complex fluids and polymer dynamics.
- Shanti Swaroop Bhatnagar Award in Engineering Sciences, 2006
 - Fellow Indian National Academy of Engineering, 2004
 - UICT Young Scientist Award, 2003
 - Indian National Science Academy (INSA) Young Scientist Award, 1996
 - CSIR Young Scientist Award, 1994
 - G. I. Kane Gold Medal, University of Bombay, 1988
 - Product technologies transferred: 2



Suresh K. Bhat
Scientist, National Chemical Laboratory, Pune

- Ph.D., Physics, Indian Institute of Technology, Delhi, 1999.
 - M.Tech., Applied Optics, Indian Institute of Technology, Delhi, 1993.
- 2006-current: Structure-Rheology-Dynamics of soft matter using scattering
2003-2006: Consultant, LS Instruments GmbH, Switzerland. Design, development and installation of novel light scattering systems.
2002-2006: Nestle Postdoctoral Fellow, Physics, Fribourg University, Switzerland.
- JSPS Postdoctoral Fellowship (2000)



Harshavardhan Pol
Scientist, National Chemical Laboratory, Pune

- MS, Materials Sci. & Engineering, Clemson University, USA, 2000.
 - B. Polymer. Eng., University of Pune, 1996.
- 2003-current: Polymer structure-processing-property relations.
2000-2003: Senior Research Engineer at The Dow Chemical Company, USA; worked in new business development for specialty polymer foams and films – particularly in processing and rheology related activities.



Neelima Bulakh
Technical Officer, National Chemical Laboratory, Pune

- Ph.D., Chemistry, University of Pune, 1999.
 - M.Phil., Materials Science, University of Pune.
- 20 years research experience in the field of polymers, which includes crystallization, morphology and mechanical properties of polymers and polymer blends, polymer processing.

Contacts:

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