ChE Graduate Seminar Series

Departmental Seminars Presented by Ph.D. Students

Recovery of Oil from Emulsion Effluents of Steel Rolling Mills

Parsanta (Advisors: Prof. A. N. Bhaskarwar)

13th November 2014, Thursday, 0400-0430 pm (20+10 mins), ChE Seminar hall

In steel rolling mills, oil-in-water emulsions are used as a coolant and lubricant. Such emulsions because of their very high designed stability can work at high temperatures and pressures. After several cycles of reuse, it is to be disposed off. Its disposal in this form is hazardous for the environment. Most of the conventional techniques, which are used to break such emulsions, are non-eco-friendly, costly, energy intensive, and very time consuming.
In the present work, we are developing a novel method for breaking such tough emulsions. In this method, we mix the emulsion with an optimum amount of magnetic nanoparticles (MNPs) (iron oxide) and stir for particular time. After this, it is allowed to flow on to a conveyor belt of a set-up built in house, below which we place a permanent magnet. All the MNPs with the oil of emulsion get stuck to the conveyor belt and move to one end of belt, and at the other end we collect clear water. MNPs are synthesized by co-precipitation method and characterized by HRTEM, SEM, XRD, and DLS. Steel-rolling mills' emulsion effluent is characterized by optical microscopy. It was found that the size range of MNPs was 10 – 100nm and oil droplets were about 1-2 micrometers. It was found that such MNPs are capable of breaking very stable emulsions at a low cost, quickly and easily.

Directed Assembly in Polymer Nanocomposite Melt Under Shear Field

Parvez khan (Advisors: Prof. Gaurav Goel)

13th November 2014, Thursday, 0430-0500 pm (20+10 mins), ChE Seminar hall

We are working on the processing of polymer nanoclay composites (PNCs). The goal of my work is to understand the molecular mechanisms leading to intercalation and exfoliation of layered clay platelets by polymers. During processing, these PNCs are exposed to high shear rates; we will study how this high shear affects morphological and rheological properties of these PNC films. Further, we will explore the role of molecular interactions on above shear effects to aid in programming the chemistry of nanoclay filler for desired application. In this work we are working to develop a multiscale molecular dynamic simulation approach to study both equilibrium and shear-dependent structural and dynamical properties of these nanoclay based PNCs. We will explore the effect of various intraclay and clay-polymer interactions, viz. electrostatic interactions, dispersion interactions etc. on above properties. Finally, we will determine following three properties of PNC films to evaluate their usability in packing film applications: rheological behaviour, dispersion (intercalation) of clay, and reduction in oxygen diffusion.

0500 pm High Tea

CC
All ChE Faculty
Department N. B.
PhD Students (near biometric device)
Mr. Krishna (for audio/video help)
ChE office: refreshment arrangements