

UNH Materials Science Seminar

13:10-14:00, Wednesday, September 9, 2009

Parsons Hall 226

University of New Hampshire

Investigation of Radical Entry and Diffusion within Latex Particles during Emulsion Polymerization*

Brian Perry

Materials Science Program, University of New Hampshire

*In conjunction with Brian's Master of Science Thesis defense

In the field of aqueous based free radical latex polymerization, it has been a long-standing belief that a charged polymer chain end group will exclusively anchor to the surface of a polymer particle. This notion is not intuitive for all cases, particularly in the case of an inverted core-shell composite particle where second stage polymer resides within the interior and is surrounded by first stage polymer. This dissertation describes a large variety of characterization techniques used to determine the location of polymer chain end groups in a series of seeded batch and semi-batch latex polymerizations. The analytical results of major importance include transmission and scanning electron microscopy (TEM and SEM, respectively), differential scanning calorimetry (DSC), and persulfate end group titration. Collectively, they show strong evidence against the notion of chain end anchoring being the exclusive mechanism for particle building. Additionally, calculations of single polymer chain dimensions within a latex particle in conjunction with any driving forces for chain end anchoring provide further evidence to discredit anchoring as the sole and/or predominant mechanism of particle construction.

Host: Professor Don Sundberg x1878