

UNH Materials Science Seminar

13:30-14:30, **Tuesday**, November 10, 2009

Kingsbury N343

University of New Hampshire

Morphology of solvent borne and water borne polyurethane films

Bo Jiang

Department of Mechanical Engineering, UNH

Polyurethane material has been widely used in many kinds of applications because of its special structure and excellent mechanical properties. It usually consists of both hard and soft segments in one polymer chain, and they tend to phase separate into hard and soft microdomains because of incompatibility. Therefore when the hard segment microdomains are dispersed in the soft matrix, and it strengthens the material and leads into superior performance.

In the meanwhile, its aqueous dispersion attracts more and more attention thanks to waterborne nature. After proper modification to the polyurethane chains, water could be the medium instead of harmful and usually more expensive solvents. This review will cover the chemistry of polyurethane as well as its aqueous dispersion. A major concern of this review is the special morphology of polyurethanes and factors affecting it, considering the importance of structure-property relationship.

A great advantage of polyurethane is its ability to take a wide range of modifications for different applications. And at the same time, waterborne polyurethanes need further modifications for better water/solvent resistance and improved mechanic performance. One of the approaches is to increase the crosslink density of the polymer by modifying the chain ends, adding crosslink agents, and so on. Making polyurethane dispersion into blends or hybrid materials by mixing with other kinds of materials is another way of modification for lower cost and better performance. Current research interests and further directions will also be mentioned at the end.

Host: Professor Don Sundberg x1878