Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Self-Healing of a Polyurethane-based Polymer Composite
MELISSA CONSIDINE, ERIN DREYER, S. PAUL FREESE, PAUL LEDWITH, JOANNA MEADOR, Materials Science and Engineering, University of Maryland
— An attempt has been made to extend the development of a self-healing polymer system to polyurethane polymers. Self-healing materials can improve reliability and prevent catastrophic failure of critical components that are inaccessible for routine maintenance and inspection. Previous work by others has shown that monomer-filled microcapsules embedded in an epoxy matrix containing dispersed solid catalyst can autonomously heal stress induced cracking. Synthesis of *in-situ* dicyclopentadiene (DCPD) encapsulated in poly(urea-formaldehyde) is embedded in a two-part (rigid) polyurethane matrix containing dispersed Grubb's catalyst. The modified composite is subsequently characterized. Characterization and testing of the as-fabricated polymer composite samples includes optical microscopy, scanning electron microscopy, FTIR spectroscopy, tensile testing and Izod impact testing. Following microcracking, induced toughening of the polymer matrix is anticipated as a result of microcapsule rupture that will release monomer to polymerize upon reaction with the embedded catalyst.

Robert Briber
Materials Science and Engineering, University of Maryland

Date submitted: 07 Dec 2004 Electronic form version 1.4