MAR12-2011-001009

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

Self-healing polymers and mechanochemistry[1]

STEPHEN CRAIG, Department of Chemistry, Duke University

The forces that accompany macroscopic deformation and material failure are many orders of magnitude larger than the forces between the individual atoms of a molecule. The magnitude of macroscopic forces, in combination with the fact that they are directional, creates an opportunity to direct new, stress-responsive chemistry on demand in polymer materials. This talk will present studies of reactions under large, directional forces, and their applications in new classes of stress-responsive polymers, including a class of self-healing polymers in which mechanical activation of chemical reactions leads to improved structure and properties under conditions that are typically destructive to both.

[1]This material is based on work supported by the U.S. Army Re-search Laboratory and the Army Research Office under Grant W911NF-07-1-0409.