Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Modeling thermal-mechanical behavior of networks with reconfigurable crosslinks[1] JEH-CHANG YANG, YUAN MENG, MITCHELL ANTHAMATTEN, University of Rochester — Actively moving polymers nearly always involve the storage or release of mechanical energy using external stimuli. Thermomechanical experiments were conducted on well-defined chemical networks bearing both permanent and light-reconfigurable covalent junctions. Experimental data include stress relaxation and mechanical creep during photoinduced network reconfiguration as well as equilibrium stress-strain behavior of reprogrammed networks. Physical models of elastic networks were applied to describe thermomechanical behavior during and after bond re-formation while under external stress. The role of dangling ends in influencing competitive network mechanics is evaluated to explain observed phenomena and discrepancies between theory and data. Understanding how process path is related to the equilibrium thermomechanics of such reprogrammed networks is important to engineering shape actuator driven by crystallization.

[1]NSF ECCS-1530540

Jeh-Chang Yang
University of Rochester

Date submitted: 06 Nov 2015 Electronic form version 1.4