

ROMP Healing Agent Development for Self-Healing Materials

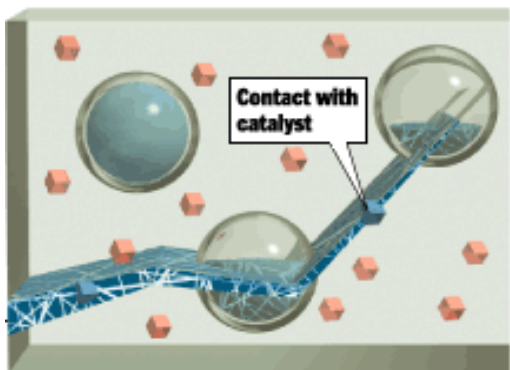
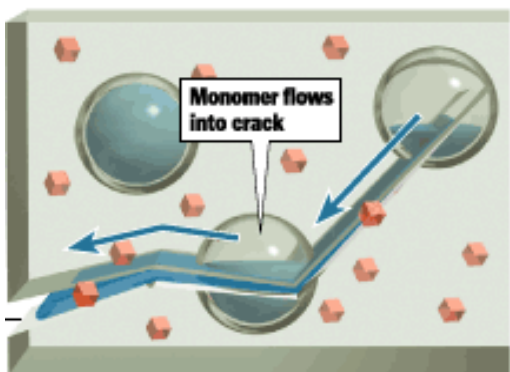
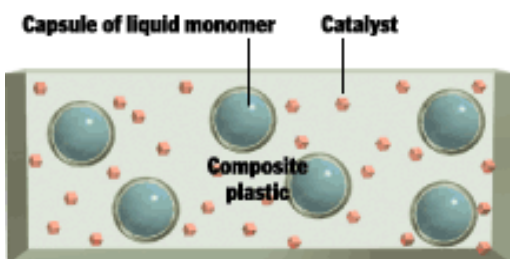
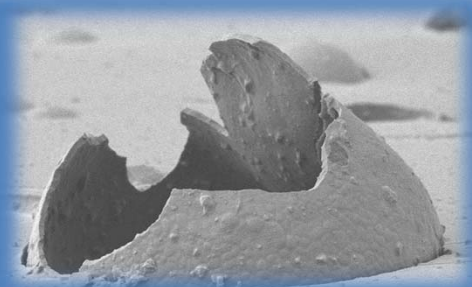
Michael Kessler

Department of Materials Science and Engineering

Iowa State University

2220 Hoover Hall

Ames, IA 50011, USA



Self-healing polymers incorporate liquid healing agent-filled microcapsules and catalyst particles into a polymer matrix. Upon material fracture, microcapsules rupture, followed by flow of the liquid healing agent into the crack volume. When the healing agent contacts the catalyst particles it polymerizes and adheres the crack faces together (left). Early work in the field of self-healing has only utilized a few healing agent/catalyst combinations with minimal optimization. We have expanded on this initial work by developing new healing agents, which were tested using a modified rheokinetic technique designed to mimic the self-healing mechanism (below right). Using this modified technique, we were able to identify and elucidate the complex effect of numerous factors (e.g. temperature (below center)) on the healing mechanism.

