

Abstract Submitted
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Self-Healing of Polyethylene Oxide DORINA MAGDALENA CHIPARA, MARITZA FLORES, NANCY PUENTE, KAREN LOZANO, The University of Texas Pan American — Autonomic self-healing is expected to enhance the lifetime of polymeric materials, resins, and composites subjected to long term mechanical stresses. The self-healing process is initiated by the rupture of some polyurea-formaldehyde microcapsules filled with monomer. The self-healing polymer is actually a compound containing microcapsules filled with monomer and catalyst particles. The monomer released from these broken microcapsules is diffusing within the polymer, reacting with the catalyst and starting a polymerization reaction. This new polymer, growing within the propagating crack, stops the mechanical failure. While the process is pretty slow (timescale of the order of 10 to 100 s), there are many important technological applications that would benefit from the availability of self-healing polymers. We report about the addition of self-healing capabilities to polyethylene oxide by using polyurea formaldehyde microcapsules filled with dicyclopentadiene and first generation Grubbs catalysts. Details regarding the physical and chemical steps used to add self-healing capabilities to polyethylene oxide will be presented. Self-healing efficiency was assessed by fatigues tests.

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