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Raman Spectroscopy of Poly-Urea Formaldehyde Microcapsules OMAR ESPINO, DORINA CHIPARA, MIRCEA CHIPARA, MELISSA MARTINEZ, None — The objective of this research project was to add self-healing capabilities to polymeric nanocomposites. We used the "classical" method to obtain self-healing polymers with the addition of TiO_2 nanoparticles in the self-healing system. Self-healing polymers are obtained by dispersion of first generation Grubbs catalysts and microcapsules filled with monomers (typically DCPD). These kind of "smart materials" are able to survive to high mechanical stress via the ignition of the so called "autonomous self-healing mechanism" which is actually a ring opening methatesis polymerization (ROMP) reaction triggered by mechanical stresses in excess over a threshold limit through the rupture of microcapsules and the release of the monomeric content. As a preliminary step for adding self-healing capabilities in nanocomposites, the synthesis of microcapsules filled with dicyclopentadiene (DCPD) is vital for the addition of self-healing capabilities to polymeric matrices. We synthesized polyurea-formaldehyde (PUF) microcapsules filled with monomer (DCPD) using the in-situ polymerization. The synthesis was monitored by Raman spectroscopy, optical microscopy, and pH measurements that has been extensively used as a non-invasive techniques in the characterization of polymers and monitoring of organic reactions. The goal of this research was to assess the formation of the microcapsules during synthesis and the presence of the DCPD in the microcapsules. Samples were taken during the synthesis every 30 minutes and analyzed by Raman spectroscopy, and optical microscopy keeping a control over the pH of the solution.

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None

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