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Spectacular Improvements in Toughness of Poly(lactide-co- glycolide), PLG, Nanocomposites HARIS RETSOS, MSE CORNELL UNIVERSITY, ITHACA, NY TEAM — Poly(lactide-co-glycolide) (PLG), a biocompatible, biodegradable polymer, was toughened by adding small amounts of surface modified clay nanoparticles. The elongation of nanocomposite during tensile tests is highly increased in comparison with that of the pure polymer, while we observed also an increase in modulus. Electron microscopy, X-ray scattering, rheometry and dielectric spectroscopy were used to investigate the toughening mechanism. It is revealed that multiple crazing occurs in the clay nanocomposite right after the yield point. The fibrils in the crazes have the ability to be significantly extended before fracture, which translates into a dramatic increase in elongation before failure. Rheological studies show that the nanoclay particles act as physical crosslinks that increase the fracture strength of the polymer. Small angle x-ray scattering used to investigate any orientation of nanoparticles during deformation and their mobility provided by the polymer matrix.

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