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Development of New Elastomers and Elastic Nanocomposites from Plant Oils LIN ZHU, Dept Chemical Engineering, RICHARD WOOL, University of Delaware — Economic and environmental concerns lead to the development of new polymers from renewable resources. In this research, new elastomers were synthesized from plant oil based resins. Acrylated oleic methyl ester (AOME), synthesized from high oleic triglycerides, can readily undergo free radical polymerization and form a linear polymer. To achieve the elastic properties, different strategies have been developed to generate an elastic network and control the crosslink density. The elastomers are reinforced by nanoclays. The intercalated state has a network structure similar to thermoplastic elastomers in which the hard segments aggregate to give ordered crystalline domains. The selected organically modified clay and AOME matrix have similar solubility parameters, therefore intercalation of the monomer/polymer into the clay layers occurs and the nano-scale multilayered structure is stable. *In situ* intercalation and solution intercalation were used to prepare the elastic nanocomposites. Dramatic improvement in mechanical properties was observed. Changes of tensile strength, strain, Young's modulus and fracture energy were related to the clay concentration. The fracture surface was studied to further understand clay effects on the mechanical properties. Self-Healing of the intercalated nanobeams, thermal stability, biocompatibility and biodegradability of this new elastomer were also explored.

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