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Mechanochemical modification of lignin and application of the modified lignin for thermoplastics and thermosets XIAOJIE GUO, JINWEN ZHANG, JUNNA XIN, Washington State University — In this work, mechanochemical modification of lignin and use of the modified lignin in thermoplastics and thermosets were studied. Oleated lignin was successfully prepared by transesterification between lignin and methyl, and the oleation reaction was performed in a solvent-free and room temperature ball milling process with a relatively short time. PLA/lignin blends were prepared through melt extrusion. Compared with the PLA/lignin blends, the PLA/oleated lignin blends exhibited finer dispersion of lignin in the blends, increased glass transition temperature and higher tensile properties, suggesting improved compatibility between lignin and PLA. Carboxylic and anhydride groups were also introduced into the structure of lignin via mechanochemical modification, and the resulting lignin derivatives were used as curing agents for epoxies. The dynamic mechanical properties and thermal stability of the cured epoxy resins were studied using dynamic mechanical analysis (DMA) and thermogravimetric analysis (TGA).

Xiaojie Guo
Washington State University

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