Dynamic ionic bonding chain extenders enable high ductility in PLA

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Poly (lactic acid) (PLA) is the most promising eco-friendly polymer that is expected to replace the use of commodity petroleum-based plastic. However, the inherent low toughness and brittleness of PLA was limited to the application of various industries. Herein we developed a new highly ductile PLA chain extender using ionic bonding. Acrylic-based chain extender was designed by adding tertiary amine which can form ionic bonding with COOH at terminated PLA.our ionic bonding added PLA shows a variety mechanical properties, including high ductility(toughness) and reversible mechanical strength. It also showed selective physical property change depending on the deformation speed. The properties of the added PLA was investigated by tensile testing, dynamic mechanical analysis, izod impact strength, rheometer, FT-IR, NMR, etc.