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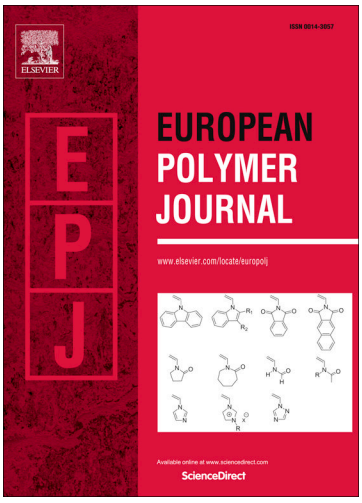

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Renewable Resource-based Elastomer Nanocomposite Derived from Myrcene, Ethanol, Itaconic acid and Nanosilica: Design, Preparation and Properties

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Abstract

Biobased elastomer materials from renewable resources aimed at substitution of petroleum-based derivates for engineering application have recently become a growing research focus. Herein, we brought out the strategy to fabricate elastomer from biobased chemicals—myrcene, itaconic acid, ethanol and nanosilica. Diethyl itaconate, which can be obtained via esterification from itaconate acid and ethanol, was copolymerized with myrcene through a facile method of redox-initiated emulsion polymerization. The copolymers with different diethyl itaconate contents exhibited the number average molecular weight range from 71000 to 174000 and predominately composed of 1,4-tans and 1,4-cis myrcene units. The glass transition temperatures of the copolymer were between -17.8 and -46.1 ℃. Combing the molecular structure design and silica-silane technology, we manufactured silica/poly(myrcene-*co*-diethyl