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Facile synthesis and characterization of activated star-shaped itaconic acid based thermosetting resins

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ACCEPTED MANUSCRIPT

1	Facile Synthesis and Characterization of Activated Star-shaped Itaconic acid based
2	Thermosetting Resins
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l1	
12	Abstract
13	Novel star-shaped thermosetting resins were synthesized by condensation-reaction of itaconic
L4	acid and glycerol, followed by treatment of the oligomers, by methanol and allyl alcohol.
L5	Employing ¹ H and ¹³ C NMR and FT-IR, the chemical structures of the resins were studied. The
L6	thermomechanical properties were evaluated by Differential Scanning Calorimetry (DSC) and
L7	Dynamic Mechanical Analysis (DMA). Viscometry and thermogravimetric analyses (TGA) were
L8	also employed to study the rheological and thermal properties of samples. The viscosity of the
19	methanol-treated resin was 4.2 Pa.s at 25 °C, which dropped to 0.25 Pa.s at 70 °C. The allyl
20	alcohol-treated resin showed a lower viscosity (1.8 Pa.s at room temperature, and 0.14 Pa.s at 70
21	°C). A substantially higher glass temperature (Tg) was recorded for methanol-treated resin (150
22	°C) compared to that of the allyl alcohol-treated resin (93 °C). Compared to the allyl alcohol-
23	treated resin, very good mechanical properties for the methanol-treated resin was achieved, in

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