STRAIGHTFORWARD SYNTHETIC PROTOCOL TO BIO-BASED UNSATURATED POLY(ESTER AMIDE)S FROM ITACONIC ACID WITH THIXOTROPIC BEHAVIOR

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In the field of polymer chemistry, tremendous efforts have been made over the last decade to replace petrochemical monomers with building blocks from renewable resources. In this respect, itaconic acid has been used as an alternative to acrylic acid or maleic acid in unsaturated polyesters for thermal or UV-curing applications. However, examples of poly(ester amide)s from itaconic acid are scarce. Under standard polycondensation reactions, the presence of free amines leads to aza-Michael addition reactions at the α,β-unsaturated double bond of the itaconic acid and isomerization reactions to mesaconic acid. Both reactions make the resulting materials useless as UV-curing polymer resins. To avoid these undesired side reactions, we herein report the use of preformed, well-defined diols containing internal amide bonds. The resulting unsaturated poly(ester amide) resins were analyzed before and after UV-induced crosslinking. Viscosity measurements revealed a strong thixotropic behavior induced by the amide groups, which is usually not detected in structurally similar polyester resins.