

Cycloaddition of Epoxides and CO₂ Using Environmentally Friendly Quaternized Chitosan as an Efficient Catalyst

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Chitosan (CHT) has a natural origin, possesses a unique chemical structure, and is a congener of a family of biopolymers with versatile physical and chemical properties. Chemical modification of CHT through the introduction of quaternary ammonium moieties into the polymer backbone gives it excellent catalytic activity for the cycloaddition reaction of allyl glycidyl ether (AGE) and CO₂ under solvent-free conditions. The surface quaternization of CHT has been characterized by means of various physicochemical methods. The catalyst system was recyclable and was reused. It has been demonstrated that the inherently present hydroxyl group in the catalyst had a synergistic effect with halide anions, and a high yield of cyclic carbonates and excellent selectivity could be obtained under optimum conditions. The entire process represents an ecologically safer route for the synthesis of cyclic carbonates.