

Microwave assisted rapidly synthesized amino acid ionic liquids for cyclic carbonate synthesis from CO₂ and epoxides

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Epoxides are the most widely applied substrates with which CO₂ undergo cycloaddition to yield cyclic carbonates, an industrially important chemical. Of the manifold catalytic systems developed for effectuating this reaction, ionic catalysts such as ionic liquids with hydrogen bonding groups stands out as the most promising ones. With the objective of rendering green tag to the catalysts, amino acids were also tried for its catalytic property in the CO₂-epoxide cycloaddition reaction, but only to find that, amino acids in its inherent form without a mobile anion is inefficient as a catalyst under mild reaction conditions. Hence, in this study, we synthesized amino acid ionic liquids (AAILs) via a simple acidification/quaternization in water using microwave energy and its catalytic properties were studied. The basic AAILs such as His-HI (histidine-HI) rendered nearly 95% conversion of propylene oxide (PO) to propylene carbonate (PC) with 120 °C, 1 MPa in 3 h. The synergistic effect between the “ anion-COOH-NH” moieties supposedly played the pivotal role in the efficient conversion of PO to PC.