

Synthesis of Cyclic Carbonates Catalyzed by Hydrogen Donor Based Catalyst

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The synthesis of cyclic carbonate from CO₂ and epoxide catalyzed by ionic liquids (ILs) has attracted much more attention in recently years. In the early reseach, we found that water could promote the cycloaddition of CO₂ and epoxides, and the corresponding reaction rate could be enhanced by 5-6 times compared to that in the absence of water. As a continous work, some hydrogen bond based catalyst were synthesized and used for further investigation on the synergistic effect. It was found that general OH-group containing solvet chemicals could also enhance the activity of tradition catalysts for the synthesis of cyclic carbonates without metal halide. The prepared ILs functionalized with hydrogen bond donors (e.g. -OH, -COOH) exhibited excellent catalytic performances comparing to the traditional ILs with respect without co-catalyst and co-solvent. Thereafter, highly active and stable molecular sieve and polymer supported functionalized IL catalysts were developed, and successfully applied them in a 500h fix-bed test. Based on the above previous results, a synergistic activate effect of hydrogen bonding on the ring-opening of epoxide was proposed.