

Synthesis of glycerol carbonate from urea and glycerol over metal oxide catalysts

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The influences of acid–base properties of metal oxides on the catalytic performance for synthesis of glycerol carbonate from urea and glycerol was investigated. CaO, La₂O₃, MgO, ZnO, ZrO₂, and Al₂O₃ were used as catalysts. Among the catalysts, amphoteric ZnO showed the best catalytic activity toward glycerol carbonate. It might be due to a balanced bifunctional acid–base property of ZnO where the Lewis acid activates the carbonyl of the urea and the conjugated basic site activates the hydroxyl group of the glycerol. Based on the experiential investigation, the reaction conditions over ZnO for a batch process were optimized, and the highest glycerol carbonate yield was attained (based on urea) to 66%.