

Surfactant-assisted synthesis of basic metal oxides and its catalytic activity on the transesterification of dimethyl carbonate with glycerol

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The increase of biodiesel production causes the rise in supplies of glycerol, thus depressing glycerol prices. Accordingly, utilization of glycerol into more valuable products is needed. One of valuable glycerol derivative is glycerol carbonate, which have many useful applications such as a nonvolatile solvent, a component in coatings, detergents, membranes for gas separation, and as a monomer of polycarbonate and polyurethane. Three different preparation methods, including surfactant-assisted method were carried out for synthesis of MgO and La<sub>2</sub>O<sub>3</sub>. Different preparation method resulted different morphologies of metal oxides and interestingly, it also showed different catalytic activity in the synthesis of glycerol carbonate. Surfactant-assisted synthesis of metal oxides exhibited the highest catalytic activity, even though its surface area is smaller than the other preparation methods. This high catalytic activity is attributed to the higher basic site concentration on the surface as shown by TPD of CO<sub>2</sub> analysis and benzoic acid titration method using Hammett indicators. Moreover, catalyst reusability, the effect of surfactant amount and calcination temperature to metal oxides morphology and catalytic activity were also discussed in detail.