

**Dimethyl ether synthesis on bifunctional Cu-ZnO/Al<sub>2</sub>O<sub>3</sub> catalysts: Effects of acidic site and copper surface area to catalytic performance**

정지우, 이발상<sup>1</sup>, 구현모, 이영준, 배종욱\*, 박명준<sup>1</sup>  
성균관대학교; <sup>1</sup>아주대학교  
(finejw@skku.edu\*)

The dimethyl ether (DME) synthesis on the bifunctional Cu-ZnO/Al<sub>2</sub>O<sub>3</sub> has been investigated to elucidate the effects of acidic site density with metallic copper surface area for catalytic performance. The direct synthesis DME from syngas is generally required two active sites such as hydrogenation of CO on metallic copper sites and dehydration of methanol on acidic sites. The bifunctional catalyst, Cu-ZnO/Al<sub>2</sub>O<sub>3</sub>, could be designed to have these two active sites by controlling preparation conditions. The catalysts were prepared by co-precipitation method in the slurry of acid catalyst of Al<sub>2</sub>O<sub>3</sub> by varying weight ratio of CuO-ZnO/Al<sub>2</sub>O<sub>3</sub>. The catalytic activity for DME synthesis is well correlated with copper surface area and acidic site density, and product distribution of methanol and DME is strongly affected to the amount of acidic sites which was controlled by changing the CuO-ZnO/Al<sub>2</sub>O<sub>3</sub> weight ratio. The catalytic activity was further explained by carrying out NH<sub>3</sub>-TPD analysis and copper surface area measurement using N<sub>2</sub>O titration method.