

Effect of metal oxides on Cu/ZnO based catalysts for methanol synthesis from various ratio of CO/CO₂ and H₂

유천재¹, 홍윤기¹, 문동주², 이관영^{1,3,*}

¹고려대학교 화공생명공학과; ²KIST 청정에너지연구센터;

³고려대학교 GREEN SCHOOL

(kylee@korea.ac.kr*)

As emission standards have limited CO₂ emission strictly, interests on carbon dioxide capture, storage and utility has been increased. Methanol synthesis process is one of the most promising solution to greenhouse effect because methanol is synthesized by syngas(H₂+ CO) and CO₂. Existing commercial catalysts are based on Cu/ZnO/Al₂O₃ catalysts. These catalysts are effective for high ratio of CO/CO₂, but methanol yield is sharply decreased at low ratio of CO/CO₂. For this reason, research of new catalysts on methanol synthesis is required to accomplish high conversion of CO₂ and yield of methanol.

In this research, metal oxides (Ce, Mg, Zr, Al, Ga) were added to Cu/ZnO based catalyst by co-precipitation method. Ratio of CO/CO₂, reaction temperature and pressure were varied to find out optimum reaction condition. Throughout the experiments, Cu/ZnO/ZrO₂ catalyst showed high conversion of CO₂ and yield of methanol among Cu/ZnO based catalysts. As the ratio of CO/CO₂ was decreased, yield of methanol was decreased, but conversion of CO₂ was increased.