

Effects of metal promoters on mesoporous Zr-incorporated Fe<sub>2</sub>O<sub>3</sub> catalyst for CO<sub>2</sub> hydrogenation

조재민, 배중욱<sup>1,†</sup>

성균관대학교; <sup>1</sup>성균관대학교 화학공학부

(finejw@skku.edu<sup>†</sup>)

Among typical CO<sub>x</sub> hydrogenation reactions, Fischer–Tropsch synthesis (FTS) reaction has been well-known to transform syngas to a wide range of hydrocarbons. In our previous studies, the ZrO<sub>2</sub> incorporated mesoporous Fe<sub>2</sub>O<sub>3</sub> showed an improved catalytic activity and stability. In the present study, CO<sub>2</sub> hydrogenation was applied to verify the various chemical promoters such as Pt, Ru, and Mn on the highly ordered mesoporous ZrO<sub>2</sub>-Fe<sub>2</sub>O<sub>3</sub>. The metal-promoted FTS catalysts showed an enhanced catalytic activity by increasing the reducibility of the active Fe<sub>2</sub>O<sub>3</sub> to form active iron carbides preferentially. In order to characterize the effects of the metal promoters on the ordered mesoporous ZrO<sub>2</sub>-Fe<sub>2</sub>O<sub>3</sub>, powder X-ray diffraction (XRD), temperature-programmed reduction (H<sub>2</sub>-TPR), N<sub>2</sub> physisorption analysis, and X-ray Photoelectron Spectroscopy (XPS) were carried out.

Keywords : mesoporous Fe<sub>2</sub>O<sub>3</sub>; metal promoters; CO<sub>2</sub> hydrogenation; structure stability; enhanced activity and selectivity.