

The effect of Cu/Fe molar ratio on the catalytic performance over copper ferrite integrated with mesoporous alumina catalysts for high temperature water gas shift reaction

김학민, 정대운, Ajay Jha, 심재오, 장원준, 전경원, 나현석,  
이열림, 노현석<sup>†</sup>  
연세대학교

The copper ferrite integrated with mesoporous alumina catalysts have been applied for high temperature water gas shift reaction from waste-derived synthesis gas. The Cu/Fe molar ratio was systematically varied to optimize  $\text{Cu}_x\text{Fe}_{(3-x)}\text{O}_4$ -MA catalysts ( $x = 0.5, 1.0, 1.5, 2.0, \text{ or } 2.5$ ). The copper ferrite catalyst prepared at the Cu/Fe molar ratio of 1 exhibited the highest CO conversion as well as 100 % selectivity to  $\text{CO}_2$  among prepared catalysts. The improved performance of the catalyst is attributed to the easier reducibility and formation of reduced form of the Cu-species. In addition, the optimized catalyst showed stable activity ( $X_{\text{CO}}=78\%$  at 450 °C) for 30 h even at a very high GHSV of 84,000  $\text{h}^{-1}$ .