

The effect of precursor concentration on co-precipitated Fe-Al-Cu catalyst for high-temperature water gas shift reaction

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The high-temperature water-gas shift (HT-WGS:  $\text{CO} + \text{H}_2\text{O} \leftrightarrow \text{H}_2 + \text{CO}_2$ ) reaction has increased interest in relation to the generation of clean  $\text{H}_2$  from waste-derived syngas. The HT-WGS reaction is carbon monoxide (CO) conversion step to remove CO and to produce  $\text{H}_2$  from the syngas ( $\text{H}_2 + \text{CO}$ ). Fe/Cr catalyst has been used as a commercial catalyst for the HT-WGS reaction, but the environmental and health concerns related to hexavalent chrome ( $\text{Cr}^{6+}$ ) should be addressed. In this study, Fe-Cu-Al catalyst prepared by a facile co-precipitation method has been selected as one of the alternative catalyst because of its highly active and stable activity. However, the gap between laboratory evaluation and scale up is a major obstacle for the commercial application of the Cr-free catalyst. Thus, it is necessary to study about the significant parameter affecting the properties of the Fe-Cu-Al catalysts during the co-precipitation. The goal of this work is that we have prepared the Fe-Cu-Al catalyst with various solution compositions and compared its activity with the catalyst synthesized from the large-scale production.