

Bimetallic Co-Fe catalysts for production of paraffinic hydrocarbons (C<sub>2</sub>-C<sub>4</sub>)

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Synthetic natural gas (SNG) has been expected as a potential substitute of fossil fuel. However, heating value of SNG is lower than standard heating value for power generation (especially in South Korea and Japan). Thus, it is necessary to increase the heating value of SNG by adding paraffinic hydrocarbons (C<sub>2</sub>-C<sub>4</sub>) through Fischer-Tropsch synthesis. In this study, bimetallic Co-Fe catalysts supported on alumina were developed for the production of paraffinic hydrocarbons (C<sub>2</sub>-C<sub>4</sub>). Based on XRD and H<sub>2</sub>-TPR results, it is found that cobalt improved reducibility of iron in high cobalt-to-iron catalysts. This is because incorporation of cobalt into Fe<sub>2</sub>O<sub>3</sub> weakened the strong interaction between iron and alumina support, resulting in decrease of reduction temperature. In addition, activity tests of bimetallic Co-Fe catalysts were conducted to investigate effect of cobalt-to-iron ratio on catalytic performance. Of all catalyst, 5Co-15Fe showed the best performance with 91.2% CO conversion, 28.2% C<sub>2</sub>-C<sub>4</sub> selectivity, at 300°C.