

## Performance of Ce-incorporated KIT-6 supported cobalt catalysts for Fischer-Tropsch synthesis

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### ABSTRACT

A series of Ce-incorporated structure of cubic large mesoporous molecular sieves, KIT-6, with different Ce contents were synthesized by a direct hydrothermal process. A sample of Ce-loaded KIT-6 material was synthesized by incipient wetness impregnation. Similarly, catalysts with 15 wt.% Co loading on the above supports were also synthesized by incipient wetness impregnation. The supports and catalysts were characterized by X-ray diffraction, diffuse reflectance UV-vis, solid-state <sup>29</sup>Si magic-angle spinning nuclear magnetic resonance, H<sub>2</sub>-temperature programmed reduction, H<sub>2</sub>-temperature programmed desorption and oxygen titration. The structure of the KIT-6 support was well retained after Ce incorporation. Small amounts of Ce in the Co catalyst were found to improve the activity and increase the selectivity to C<sub>5+</sub> hydrocarbons for Fischer-Tropsch synthesis, while larger amounts of Ce had the reverse effect. Meanwhile, methane selectivity shows an opposite trend as compared with that of C<sub>5+</sub> selectivity. Ce-loaded KIT-6 supported Co catalyst showed lower activity than KIT-6 supported Co catalyst. © 2011 World Scientific Publishing Company.

### KEYWORDS:

Fischer-Tropsch synthesis; KIT-6; Co; Ce-incorporated

## ACKNOWLEDGEMENT

Financial support from the National Natural Science Foundation of China (Grant No. 21073238), the National Basic Research Program of China (Grant No. 2011CB211704) and the Natural Science Foundation of Hubei Province of China (Grant No. 2009CDA049) are gratefully acknowledged.

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