

Deactivation and regeneration for the hybrid catalysts (Cu-Al-SBA-15) in dimethyl ether steam reforming

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The durability of the hybrid catalysts (Cu-Al-SBA-15) prepared by one-pot synthesis method was investigated during the dimethyl ether steam reforming. The deactivation and regeneration behaviors of the hybrid catalysts in dimethyl ether steam reforming were conducted in various conditions. The deactivation of the hybrid catalysts could be inhibited by increasing the ratio of steam/dimethyl ether, lowering the space velocity, or reducing the reaction temperature. A higher ratio of Cu/Al could also prolong the life of the hybrid catalysts. The carbon deposition of the hybrid catalysts occurred mainly in the reaction temperature range of 250 ~ 300 °C. The regeneration treatment with air at 500 ~ 700 °C could recover the catalytic performance of the deactivated catalysts as the fresh catalyst. Its effect was due to the redispersion of metallic Cu as well as the removal of carbon deposit by burning.