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MnMCM-48, CoMCM-48 AND CoMnMCM-48 MESOPOROUS CATALYSTS FOR THE CONVERSION OF METHYLCYCLOPENTANE (MCP)

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Abstract

Manganese and cobalt ions planted approach was used to introduce manganese/cobalt species into MCM-48-type mesoporous materials. For comparison, the cobalt was highly dispersed within the channels of mesoporous MnMCM-48 samples by impregnation approach. The prepared mesoporous materials were characterized by physico-chemical techniques, including SEM, TEM, N₂ sorption, XRD, XPS, and elemental analysis. The physico-chemical characterization revealed that all of the samples retained a high surface area and regular cubic mesoporosity and that the manganese, cobalt and cobalt-manganese were highly dispersed. The catalytic activities of these samples were studied with respect to the conversion of methylcyclopentane (MCP) in reductive media as a function of the reaction temperature (150-500°C). Irrespective of the temperature of reaction, the MnMCM-48 mesoporous samples did not exhibit catalytic activity, which suggests that the electrophilic manganese oxygen species, operative over all the samples, were inactive sites for the conversion of MCP. The addition of cobalt favored catalytic activity. A symbiotic process between the MnMCM-48 support and the Co nanoparticles likely occurs as reveals the catalytic tests. CoMCM-48 (Si/Co = 40) exhibited outstanding ring-opening selectivity.

Key words: cetane number, conversion of MCP, mesoporous catalysts, n-hexane selectivity

Received: July 2012, *Revised final:* October 2012, *Accepted:* November 2012

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