Oxidation of a lignin-derived-model compound: *Iso*-eugenol to vanillin over cerium containing MCM-22

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Abstract

A series of Ce-containing MCM-22 zeolites with varying cerium concentrations were synthesized and were thoroughly studied by various spectroscopic and analytical methods. The powder XRD, FT-IR and surface area analysis confirm the presence of well-ordered MCM-22 framework. The DRUV-Vis spectral and XPS analyses confirmed the presence of cerium ion in both +3 and +4 oxidation states with tetrahedral coordination. Interestingly MCM-22 containing a small amount of cerium ion (Si/Ce ratio of 200) facilitates a good conversion of isoeugenol (63%), with the selective formation of vanillin (75%) and the catalyst retains its activity for several cycles.

Keywords

Isoeugenol oxidation; Vanillin; Zeolite MCM-22, Cerium ions; Lignin model compounds.