

Title: Study of Pt/MCM-22 based catalysts in the transformation of n-hexane: effect of rare earth elements and mode of platinum introduction

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Abstract: The bifunctional transformation of n-hexane was carried out over Pt/MCM-22 based catalysts. MCM-22 was synthesized and submitted to ion exchange with rare earth nitrate solutions of La, Nd and Yb, followed by Pt introduction. Three different methods were used to introduce about 1 wt% of Pt in the zeolite: ion exchange, incipient wetness impregnation and mechanical mixture with Pt/Al(2)O(3). The bifunctional catalysts were characterized by transmission electron microscopy and by the model reaction of toluene hydrogenation. These experiments showed that, in the ion exchanged sample, Pt is located both within the inner micropores and on the outer surface, whereas in the impregnated one, the metal is essentially located on the outer surface under the form of large particles. The presence of RE elements increases the hydrogenating activity of Pt/MCM-22 since the location of these species at the vicinity of metal particles causes modification on its electronic properties. Whatever the mode of Pt introduction, a fast initial decrease in conversion is observed for n-hexane transformation, followed by a plateau related to the occurrence of the catalytic transformations at the hemicages located at the outer surface of the crystals. The effect of rare earth elements on the hydrogenating function leads to a lower selectivity in dibranched isomers and increased amounts of light products.

Author Keywords: MCM-22; Platinum; Rare Earth Elements; Bifunctional Catalyst; n-Hexane

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