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STRUCTURE AND THERMAL STABILITY OF CERIA-DOPED Mo/Al_2O_3 CATALYSTS

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Abstract

In order to explore the influence of CeO_2 doped Mo/Al_2O_3 catalyst on the structure and surface characteristics (surface area and porosity), an investigation was undertaken by using N_2 adsorption (BET method), thermal analysis (TG and DTA), XRD and in-situ diffuse reflectance infrared (DRIFT) techniques. In this work, the Mo/Al_2O_3 and Ce-Mo/Al_2O_3 samples were prepared with 20% Mo loading. The characterization results suggest that the Mo species were highly dispersed on alumina support and the addition of Ce exhibited reasonably lower specific surface area (29.6 m^2/g). The results showed that the Ce-Mo/Al_2O_3 material prepared by co-precipitation and calcined at 873 K revealed interactions between ceria and molybdena which were evidenced by DTA, XRD and DRIFT. The results showed diminishing particles size of the two ions and formation of Mo-O-Ce linkages (875 cm^{-1}), respectively. This proposed interaction is further emphasized by the absence of Ce-O vibration modes at 480 and 740 cm^{-1} and the appearance of coupled O=Mo=O species (995 and 1035 cm^{-1}) which could affect the catalytic activity of the catalyst that will be discussed in a subsequent publication.

Keywords: Mo/Al_2O_3, Ce- Mo/Al_2O_3, In-situ DRIFT, TG-DTA, XRD

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