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Effects of *trans*-1,2-Cyclohexanediamine-*N*,*N*,*N*',*N*'-tetraacetic Acid Addition on 1-Octene Hydrogenation Activity and Surface Structure of CoMo/Al₂O₃ Catalyst

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The present study investigated the effects of *trans*-1,2-cyclohexanediamine-*N*,*N*,*N'*,*N'*-tetraacetic acid (CyDTA) addition on the 1-octene hydrogenation activity and surface structure of CoMo/Al₂O₃ catalyst as a method to control the olefin hydrogenation activity. Irrespective of Co/Mo molar ratio, 1-octene hydrogenation activity at 453 K and 1.3 MPa decreased in the following order: Mo/Al₂O₃ > CoMo/Al₂O₃ > CyDTA-CoMo/Al₂O₃ Co/Al₂O₃. Modification with CyDTA had little effect on the hydrogenation activity of Mo/Al₂O₃. Thus, modification with CyDTA facilitates the inhibiting effect of Co addition on the hydrogenation of 1-octene. Our previous study found that modification with CyDTA greatly improves the hydrodesulfurization (HDS) activity of CoMo/Al₂O₃. Therefore, we expect that modification with CyDTA will greatly improves the HDS selectivity of CoMo/Al₂O₃ in the presence of olefins. Furthermore, the present characterization of CoMo/Al₂O₃ modified with CyDTA by NO adsorption techniques suggested that modification of CoMo/Al₂O₃ with CyDTA facilitates the formation of the Co-Mo-S phase even at lower Co/Mo molar ratio, at which Co atoms block the edge sites of MoS₂ nanoclusters, leading to the improved HDS selectivity.

Keywords: 1-Octene hydrogenation, *trans*-1,2-Cyclohexanediamine-*N*,*N*,*N* ',*N* '-tetraacetic acid, Co-Mo-S phase, FCC gasoline, Selective

hydrodesulfurization

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