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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 $CoMo/Al_2O_3$ 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 $CoMo/Al_2O_3$ 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/Al_2O_3 > $CoMo/Al_2O_3$ > CyDTA-$CoMo/Al_2O_3$ Co/Al_2O_3. Modification with CyDTA had little effect on the hydrogenation activity of Mo/Al_2O_3. 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 $CoMo/Al_2O_3$. Therefore, we expect that modification with CyDTA will greatly improves the HDS selectivity of $CoMo/Al_2O_3$ in the presence of olefins. Furthermore, the present characterization of $CoMo/Al_2O_3$ modified with CyDTA by NO adsorption techniques suggested that modification of $CoMo/Al_2O_3$ 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 MoS_2 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

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