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PREPARATION AND PROPERTIES OF SILICA-ALUMINA SUPPORTED Mo AND CoMo HYDRODESULFURIZATION CATALYSTS

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Catalysts with various MoO₃ and Al₂O₃ contents were successfully prepared by a reaction of acidic SiO₂–Al₂O₃ supports with aqueous slurry of MoO₃¹. The saturated adsorption amount of MoO₃ corresponded with the amount of Al₂O₃ in the supports. The deposited and sulfided Mo species were accessible for promotion by Co. X-ray diffraction and Raman measurements did not show MoO₃ crystalline phase in the catalysts. The highest activity in hydrodesulfurization (HDS) of 1-benzothiphene was observed over CoMo/SiO₂–Al₂O₃ catalyst with 17 wt.% Al₂O₃ (Fig. 1). The acidity of the SiO₂–Al₂O₃ supports modified by dealumination (leaching with nitric acid) and the sulfided CoMo catalysts were studied in terms of cyclohexene isomerization and cumene cracking (Fig. 2). It was found that the acidic properties of the modified SiO₂–Al₂O₃ supports were preserved after deposition of the sulfidic CoMo phase. The main factor influencing these properties was found to be the Al₂O₃ content.

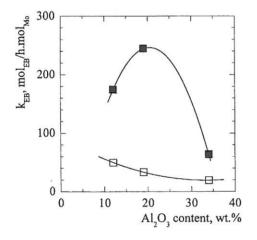


Fig. 1: Dependence of the HDS activity of the prepared Mo (open squares) and CoMo (filled squares) catalysts on Al₂O₃ content.

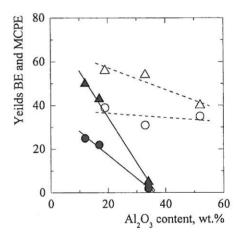


Fig. 2: Dependence of cumene cracking and cyclohexene isomerization on Al_2O_3 content in the supports (open points, dash lines) and sulfide CoMo catalysts (filled points, solid lines); benzene BE (circles) and methylcyclopentene MCPE (triangles).

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References:

¹ Kaluža, L.; Gulková, D.; Vít, Z.; Zdražil, M. Fuel **2013**, 112, 272–276.