Characterization of high surface area smectite supported cobalt oxides catalysts for hydrodesulfurization by means of TPR, TPS and ESR. Hayashi, Eiji; Iwamatsu, Eiji; Elias Biswas, Mohammad; Sanada, Yuzo; Ahmed, Shakeel; Hamid, Halim; Yoneda, Toshikazu. The Research Institute, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia. Applied Catalysis, A: General (1999), 179(1-2), 203-216. Publisher: Elsevier Science B.V., CODEN: ACAGE4 ISSN: 0926-860X. Journal written in English. CAN 130:314070 AN 1999:143386 CAPLUS

Abstract

Catalysts of cobalt oxide loaded on smectic clays having high surface areas were prepd. Smectic clays used were montmorillonite, saponite, porous saponite, hectorite and stevensite. The catalysts were tested for hydrodesulfurization (HDS) activity with thiophene in a pulse flow reactor at different temps. Co-porous saponite catalyst prepd. by an ion-exchange method in the series including CoMo-Al2O3 shows the highest thiophene HDS activity so far studied. The catalytic properties of the selected catalysts were characterized by temp.-programmed-redn. (TPR) and -sulfiding (TPS) together with ESR (ESR).The HDS performance with thiophene is closely dependent upon the redn. temp. of cobalt oxide obtained by TPR for Co-smectite catalysts. The TPS measurements indicate that small particles of cobalt oxide are highly dispersed in the smectic layer by means of ion-exchange method. It is suggested that the properties such as sensitivity toward H2S and catalyst color of cobalt oxide on Co-porous saponite by ion-exchange method are different from those of Co-porous saponite by impregnation method. Reactivity of loaded cobalt oxide with H2S is strongly dependent upon the sulfiding paths.