

Effect of H-mordenite zeolite as a component in Co-Mo-Al₂O₃ hydroprocessing catalysts used for the conversion of Boscan heavy oil

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Abstract

The effect of H-mordenite zeolite as a component in Co-Mo-Al₂O₃ hydroprocessing catalysts has been studied. Catalysts containing up to 20% H-mordenite were used for hydrocracking Boscan heavy oil at 13.9 MPa. Although the acidic sites on the external surface of the zeolite crystals were expected to increase cracking reactions, little effect on conversion was observed. As the H-mordenite content of the catalyst increased, the bulk density and the specific surface area of the catalysts decreased substantially. When the reaction results were expressed on the basis of constant residence time and constant catalyst surface area there was an increase in the reaction parameter with increasing H-mordenite content of the catalyst. It was also found that coke deposition increased with the increasing H-mordenite content of the catalyst. These two observations suggest that H-mordenite caused an increase in the number of acidic sites in the catalyst. The results indicate that catalysts with H-mordenite would produce greater conversions than catalysts without H-mordenite, if the extrudates could be prepared in such a way that the catalyst bulk density does not change when the H-mordenite is added.

Keywords

Conversion;
Heavy oils;
Zeolite