

Structure and Activity of Dispersed $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ catalysts in Hydrocracking of Vacuum Residue

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Catalytic activity and physical properties of the dispersed $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ catalysts were investigated. The $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ catalysts were prepared in situ in vacuum residue hydrocracking (VR HCK). Reaction tests were carried out in an autoclave batch reactor at 692K at 9.5MPa H_2 with the same amount of catalyst loading of 0.113 mmol as a metal basis. The $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ outperformed mono metallic sulfides of MoS_2 or WS_2 with a superior stability, demonstrating a synergic effects of the dispersed $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ on the VR HCK. Extended X-ray absorption fine structure (EXAFS) and transmission electron microscopy (TEM) analysis were used to identify structure properties of the $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ catalysts, which revealed that the dispersed $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2$ may have a uniformly mixed structure of Mo and W rather than the core-shell structure.