

## Effect of VO-Porphyrin in Asphaltenes on the Slurry Phase Hydrocracking of Vacuum Residue

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In the course of HCK, sulfur and nitrogen can be converted to H<sub>2</sub>S and NH<sub>3</sub>, whereas heavy metal compounds like V and Ni contained in the vacuum residue (VR) are transformed into respective metal sulfides causing precipitates and leading to deactivation of conventional supported hydrotreating catalysts. Recently, a slurry phase HCK using dispersed catalysts not only shows greater efficiency of conversion of VR but also is less affected by heavy metals than conventional HCK process. However, a detailed investigation on the influence of heavy metals contained in the VR on the slurry phase HCK has not been fully studied not yet. Therefore, the goal of this work is to investigate the effect of V species, the largest proportion of heavy metals in the heavy oil, on the slurry phase HCK of VR. The VR HCK were carried out at 693 K and the H<sub>2</sub> pressures of 11.0 MPa in an autoclave batch reactor with VO(acac)<sub>2</sub> as a V precursor with varying the amount of V content. Moreover, structural properties of the V species were analyzed by X-ray absorption fine structure (XAFS) and transmission electron microscopy (TEM).