

## Reactivity of Sulfur Compounds in Fluid Catalytic Cracking Decant-Oils for Hydrodesulfurization over CoMoS and NiMoS Catalysts

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Fluid catalytic cracking decant-oils (FCC-DO) are a highly aromatic mixture composed 70–90% of polyaromatics. Due to the compositional characteristics, FCC-DO is used as a raw material for producing carbon materials. FCC-DO contains heteroatomic compounds of 0.5–3.5% S and 0.1–0.3% N, in which the S and N compounds are critical in affecting the quality of the final products as they can cause puffing in the thermal processes for the production of carbon materials. In this study, the hydrodesulfurization (HDS) of FCC-DO was investigated over conventional CoMoS and NiMoS catalysts in an autoclave batch reactor at 653K and 9.4 MPa H<sub>2</sub>. The S compounds of FCC-DO were categorized into three groups according to the reactivity in the HDS. The relative content of S of FCC-DO was 60, 35, and 5% in groups 2, 3, and 4, respectively. The overall HDS rate constant of NiMoS (0.0737 h<sup>-1</sup>) was found higher than CoMoS (0.0513 h<sup>-1</sup>). Moreover, the HDS rate for the least active S groups were shown even higher over NiMoS than CoMoS, (0.0688 > 0.0418 h<sup>-1</sup>). These results demonstrate that deep S removal requires NiMoS catalyst that is more active for sterically hindered S compounds.