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## Pretreatment of Vacuum Residue Using HDS Unit for Production of RFCC Feedstock

[Hiroshi Mizutani](#)<sup>1)3)</sup>, [Yoshihiro Mizutani](#)<sup>2)</sup>, [Yoshinori Kato](#)<sup>1)</sup>, [Kazuo Idei](#)<sup>1)</sup> and [Isao Mochida](#)<sup>3)4)</sup>

1) Research & Development Center, Cosmo Oil Co., Ltd.

2) Research & Development Dept., Cosmo Oil Co., Ltd.

3) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University

4) Institute for Materials Chemistry and Engineering, Kyushu University

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The reactivity of hydrocracking and performance of vacuum residue (VR) pretreatment was studied before residue hydrodesulfurization (HDS) for successive RFCC to convert VR to gasoline. Large NiMo pores and many acid sites with moderate strength on the boria-alumina support were very favorable to enhance hydrodemetallization (HDM), HDS, and cracking of VR, which increased the yield of the lighter fraction, resulting in an atmospheric residue-like composition from VR feed for RFCC. The lifetime of the pretreatment catalyst was six months, so two alternating reactors allows one year of continuous operation of the total process without any problems. The properties of the VR pretreatment oil changed by VR pretreatment conditions were evaluated to investigate the hydrocracking reaction of VR, in particular the relationship between the reactivity of VR pretreatment oil and product properties in the HDS unit. Higher temperatures for the pretreatment led to improved quality of the product oil for successive HDS. Catalyst deactivation in the HDS unit was not influenced by the pretreatment conditions. VR conversion of more than 45% could be achieved with the combination of the VR pretreatment unit and HDS unit.

**Keywords:** [Vacuum residue conversion](#), [Swing reactor system](#), [FCC](#), [Pretreatment](#), [Hydrodesulfurization](#), [Hydrodemetallization](#)

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