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Author: <input type="text"/>	<a href="#">ADVANCED</a>	Volume <input type="text"/>	Page <input type="text"/>
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[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[PDF \(391K\)\]](#) [\[References\]](#)

## **Titanium Modified USY Zeolite-based Catalysts for Hydrocracking Residual Oil (Part 3) Preparation and Activity Test of Catalysts Based on Realuminated USY**

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A high Si/Al ratio USY zeolite with high mesoporosity was used as the starting material for hydrocracking catalysts for residual oil to improve the catalytic selectivity for middle distillate fractions. Realumination of high Si/Al USY zeolite without destruction of the zeolitic framework and mesoporous structure was achieved by treating the USY zeolite in an aqueous solution of NaAlO<sub>2</sub> after immersion in ethyl alcohol. Subsequently, titanium modification of the realuminated zeolite was carried out using an ethyl alcohol solution of titanium isopropoxide, followed by loading of molybdenum by equilibrium adsorption using an aqueous solution of ammonium paramolybdate. The resultant USY zeolite-based catalysts (MTAZ) showed higher selectivity for middle distillate fractions than previously reported titanium-modified USY zeolite-based catalysts in the hydrocracking of Arabian heavy atmospheric residue. Considering the characteristics of the catalysts, the acid sites on the MTAZ catalysts were mainly located on the mesopore surfaces and the production of gaseous and naphtha fractions was minimized because of the low number of acid sites inside the micropores.

**Keywords:** [Hydrocracking](#), [Realuminated USY zeolite](#), [Titanium modification](#), [Residual oil](#), [Mesopore](#), [Molybdenum catalyst](#)

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