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Hydrothermal Cracking of Furfural Extract into Middle Distillate Using Ni/Silica-alumina and Ni/Molecular Sieve Hybrid Catalyst

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Heavy residual products in petroleum refineries are a useful source of hydrocarbons, so are a potential substrate for producing middle distillates by hydrocracking technology to increase the supply of transportation fuels. This study used highly refractory furfural extract of lube oil containing 96.0 vol% aromatics with 4.63 wt% S, and 0.15 wt% N with a pour point of +30°C to produce middle distillates through catalytic hydrothermal cracking. The effect of various parameters such as temperature, hydrogen partial pressure, residence time and amount of catalyst were studied with 250 g feed and 25 g nickel-loaded catalyst of 20 : 80 ratio of silica-alumina (A) and molecular sieves 13X (Z) as cracking site and nickel metal serves as hydrogenation site. The maximum yield of middle distillates was 26.4 wt% at temperature 400°C, pressure 10.0 MPa, initial hydrogen partial pressure 9.0 MPa, and residence time 15 min.

Keywords: [Furfural extract](#), [Hybrid catalyst](#), [Silica-alumina](#), [Molecular sieve 13X](#), [Middle distillate](#), [Hydrothermal cracking](#)

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