

Synthesis and evaluation of bitumen hydrocracking catalyst using tailored porous alumina

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The world's demand for energy resulted in the development and exploration of new crude sources. Hence, the production of bitumen from oil sands is increasing rapidly. Bitumen is heavy, high boiling feedstock material. It needs upgrading through hydrocracking. A typical cracking catalyst consists of silica-alumina with base-metal components. However, this catalyst has mass transport limitations because the large size of bitumen's molecules.

To reduce mass transport limitations and enhance the performance of hydrocracking, macroporous Al_2O_3 loaded with Ni-Mo was used. Macroporous Al_2O_3 was prepared by sol-gel method using 50, 100, 200 and 350 nm polystyrene particles as pore template. The prepared sample has many advantages such as bimodal(macro-meso) pore distribution and high surface area. Hydrocracking of bitumen was carried out in a customer-made bath reactor at 400°C and at an initial hydrogen pressure of 70 atm. X-ray diffractometer and SEM were employed to study the structure and surface morphology of support. The reactant was analyzed by API, SIMDIS and TLC measuring device.