

Athabasca Oil Sands–Derived Bitumen Can Produce Quality Gasoline

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In earlier studies, we presented that high quality FCC feeds [1], and diesel and jet fuels [2] could be produced from Athabasca oil sands bitumen. The present paper extends the previous FCC work and demonstrates that Athabasca bitumen can also produce high quality gasoline by selecting appropriate upgrading processes.

Employing a typical commercial equilibrium FCC catalyst, ten vacuum gas oils were cracked using a riser pilot plant: one from a typical conventional Alberta light crude mix and the other 9 from various upgrading processes of Athabasca bitumen. They have a wide range of density, sulfur, nitrogen and gasoline precursors defined as mono-aromatics and saturates. Gasoline yields were determined and correlations to predict the yields were developed as a function of feed nitrogen and gasoline precursors. Gasoline quality such as Research and Motor octane numbers, and aromatics, sulfur, and nitrogen content were determined.

It was found that gasoline yield is increased by reducing feed nitrogen and increasing gasoline precursors; bitumen-derived hydrocracker bottoms produce the highest gasoline yield; hydrotreated virgin and LC-Finer VGOs produce similar gasoline yields to the typical Alberta light crude mix; octane numbers of oil sands-derived gasoline are the same as or better than those of the typical Alberta light crude mix; they increase with FCC severity and conversion; gasoline aromatics also increase with severity and conversion; and sulfur and nitrogen content is feed dependent.

References:

[1] Yui, S., Matsumoto, N. & Sasaki, Y. "Athabasca oil sands produce quality FCC feeds," *Oil & Gas J.*, pp. 43-51, Jan. 19, 1998.

[2] Yui, S. "Athabasca oil sands produce quality diesel and jet fuels," *Oil & Gas J.*, pp. 58-66, Nov. 20, 2000.