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Potentials for Diesel Fuel Production by Hydroprocessing of Middle Distillates

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Abstract *The growing demand for diesel fuel relative to fuel oil has caused refiners to increase conversion of fluid catalytic cracking (FCC) operation. This has increased production of diesel blending components, such as cracked middle distillates, which have poorer storage stability, cetane index, and fuel quality. On the other hand, diesel specifications are expected to decrease the sulfur and aromatic levels to 0.05 wt.% and 10–20 liquid volume%, respectively. Economic evaluation of alternatives to meet diesel specifications showed hydrotreating to be the most feasible. Recent studies have shown that available hydrotreating technologies need further development in catalysts and processes to meet this challenge. This paper reviews the scientific and technical literature regarding the hydrotreating of middle distillate in terms of economics, chemistry, processes, and catalysts, and proposes a new direction in technology development.*

Keywords Catalyst, cetane, diesel, hydrotreating, process.

Introduction

Refiners, over the last two decades, have faced many challenges related to changes in crude oil consumption, prices, and price differentials of light and heavy crudes as well as product slate and quality. At the refinery level these issues have a number of implications, namely:

- A new rationalization of refining capacity in light of crude supplies, prices, and quality.
- Evaluation of new processing facilities to upgrade heavy crudes for production of fuels.
- A new investment to produce higher octane unleaded gasoline and low aromatic, high cetane diesel fuel.
- Increasing environmental concerns regarding fuel quality.

The most important issues for refiners in the 1990s are changing product demand patterns and increasing consumer and government pressure for cleaner, more environ-