

PRODUCTION OF JET FUEL FROM RENEWABLE DIESEL OVER RU/ ZEOLITES

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There is currently an increasing demand for production of renewable of jet fuel. The latter, composed of n-paraffins, iso-paraffins, olefins, naphthenes and aromatic compounds¹, can be produced by hydrocracking of algae oil². Another interesting feedstock is green diesel, industrially manufactured by hydrodeoxygenation of triglycerides. In the current work hydrocracking of hexadecane, a representative molecule of green diesel, was investigated to produce aviation range hydrocarbons over Ru-H-Beta catalysts.

Ru - Beta zeolites with different acidity (Si/Al ratio) and different metal loadings, were prepared by an ion exchange method using RuCl₃ as a metal precursor. The catalysts were characterized by several physico-chemical methods. The hydrocracking was performed in a batch reactor under 45 bar of hydrogen at 240- 270°C. The internal and external mass transfer limitations were suppressed using small catalyst particles (<63 μm) and a high stirring speed. The liquid and gas phase products were analyzed by GC and confirmed by GC-MS. The results revealed that the main products were C9-C15 linear and mono-branched hydrocarbons (Fig. 1), while formation of multibranched hydrocarbons was much less profound. The kinetic analysis was performed to describe the reaction kinetics in a quantitative way.

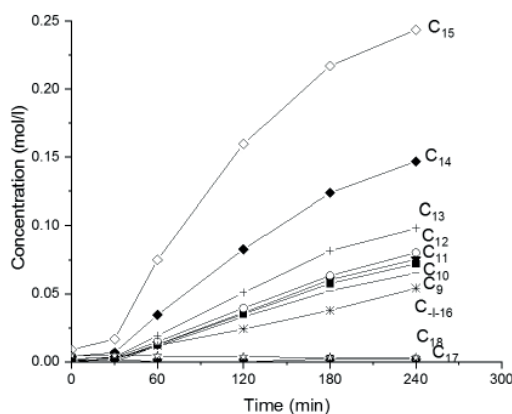


Figure 1. Concentration of C9-C15 alkanes in hexadecane hydrocracking at 240 oC under 45 bar H₂ over 2 g of 5 wt% Ru-H-Beta-300.

References

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