

# Theoretical and Experimental Investigations Studying Hydrogen Donor Effect on BTX formation during LCO Cracking

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## ABSTRACT

The polycyclic aromatics present in light cycle oils (LCO) are attempted to convert into mono-aromatic (Benzene, Toluene and Xylene (BTX)) mixture. In the study, naphthenes and straight-chain alkanes are used as in-situ hydrogen donors, enhancing activity of the hydrogen transfer reactions. USY zeolite catalyst is used for cracking LCO model compound in the fixed bed micro activity testing (MAT) reactor setup varying hydrogen donor percentage in the feed. Moreover, the effect of hydrogen donor on benzene, toluene, and xylene (BTX) production is also studied through experiments in MAT reactor unit followed by thermodynamic analysis of cracking of the LCO model compounds. In results, it is observed that as the percentage of hydrogen donor increased, the BTX formation rate increased proportionally in both experimental and aspen simulations.

**Keywords:** Light cycle oil (LCO), BTX, Hydrogen donor, Model compound, USY Zeolite

