Selective Production of p-Xylene from Biomass via CFP

Scientific Achievement

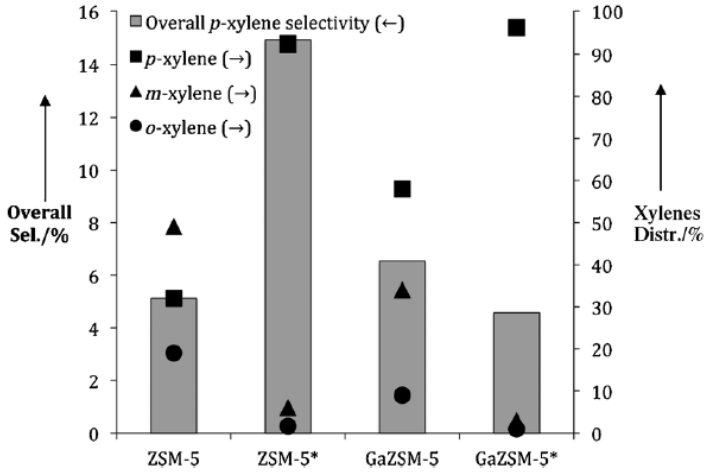
Selective production of p-xylene from biomass via catalytic fast pyrolysis (CFP).

Significance and Impact

This study opens the door to inexpensive production of renewable p-xylene from lignocellulosic biomass.

Research Details

- p-xylene selectivity was increased among all xylenes from 32 to 96% in CFP using ZSM-5 catalysts with reduced pore openings.
- The pore opening of catalysts was narrowed by depositing silicon alkoxide onto the ZSM-5 catalyst using chemical liquid deposition.
- The dramatic improvement in p-xylene selectivity is due to the reduced pore openings of the zeolites, allowing the smaller p-xylene to diffuse out of zeolite, whereas the larger isomers isomerize to form p-xylene.



Top: Schematic of p-xylene production in narrowed pores of ZSM-5. Bottom: Selectivity of xylenes in various catalysts.

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