

[Increased Aromatics Formation by the Use of High-Density Polyethylene on the Catalytic Pyrolysis of Mandarin Peel over HY and HZSM-5](#)

Y.-K. Park, M. Z. Siddiqui, Y. Kang, A. Watanabe, H. Won Lee, S. J. Jeong, S. Kim, Y.-M. Kim

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**Abstract:**

High-density polyethylene (HDPE) was co-fed into the catalytic pyrolysis (CP) of mandarin peel (MP) over different microporous catalysts, HY and HZSM-5, with different pore and acid properties. Although the non-catalytic decomposition temperature of MP was not changed during catalytic thermogravimetric analysis over both catalysts, that of HDPE was reduced from 465 °C to 379 °C over HY and to 393 °C over HZSM-5 because of their catalytic effects. When HDPE was co-pyrolyzed with MP over the catalysts, the catalytic decomposition temperatures of HDPE were increased to 402 °C over HY and 408 °C over HZSM-5. The pyrolyzer-gas chromatography/mass spectrometry results showed that the main pyrolyzates of MP and HDPE, which comprised a large amount of oxygenates and aliphatic hydrocarbons with a wide carbon range, were converted efficiently to aromatics using HY and HZSM-5. Although HY can provide easier diffusion of the reactants to the catalyst pore and a larger amount of acid sites than HZSM-5, the CP of MP, HDPE, and their mixture over HZSM-5 revealed higher efficiency on aromatics formation than those over HY due to the strong acidity and more appropriate shape selectivity of HZSM-5. The production of aromatics from the catalytic co-pyrolysis of MP and HDPE was larger than the theoretical amounts, suggesting the synergistic effect of HDPE co-feeding for the increased formation of aromatics during the CP of MP.

\* Excerpted from online journal website (Click the title)

Frontier Labs Products used:

Multi-Shot Pyrolyzer EGA/PY-3030D, UA<sup>+</sup>-5, F-Search