

Bifunctional catalyst for selective conversion of syngas into aromatic hydrocarbons

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Aromatics such as benzene, toluene and xylene have mainly produced from petroleum from catalytic reforming or cracking. Obtaining aromatics from non-petroleum feedstocks has been paid attention because of the increase in market demand for aromatics and the depletion of petroleum resources.

In this research, bifunctional catalysts combined with K/Fe-Cu-Al and HZSM-5 were developed for the one-step conversion of syngas to aromatics. The C1-C12 range hydrocarbons with high olefin contents from syngas could be firstly produced by FTS over K/Fe-Cu-Al and subsequently converted to aromatic compounds over HZSM-5. It was confirmed that the presence of zeolite can alter the product distribution toward aromatic-rich gasoline range hydrocarbons. Effects of reaction conditions (temperature, pressure and syngas ratio) and catalyst conditions (acidity of ZSM-5, FTS/HZSM-5 catalysts ratio and proximity of the two components) were investigated for obtaining high aromatics yield.