

H-ZSM-5 and Mordenite Supported Heteropolyacid Catalysts for Synthesis of Ethyl Tert-Butyl Ether

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Oxygenated compounds are important components in the formulation of automotive gasolines because these enhances octane ratings of gasoline and also reduces carbon monoxide (CO) and unburned hydrocarbons (HC). The International Agency of Research on Cancer (IARC) and the U.S. Environmental Protection Agency (EPA) classified MTBE as a health risk threat in 2000. After the disadvantages of MTBE were revealed, ethanol derived oxygenates such as ethyl-tert-butyl ether (ETBE) and tert-amyl ethyl ether (TAEE) were found to be an alternative and environmentally friendly octane oxygenates. In this present study, modified heteropolyacid based catalysts were synthesized by impregnation method. The prepared catalysts were well characterized by XRD, BET, NH₃-TPD. Isobutylene (IB) and ethanol (C₂H₅OH) were used as reactants in vapor phase ETBE synthesis. The catalytic performance to ETBE synthesis over prepared catalyst was investigated in a fixed bed reactor system under the temperature ranges of 373–523 K and a feed ratio of IB/EtOH = 0.5 and the results are discussed. The conversion of IB is 18% and the selectivity of ETBE is 98%.