Catalytic evaluation of small-pore molecular sieves with different framework topologies for the synthesis of methylamines

전희영, 신채호*, 정혜자[1], 홍석봉[1]
충북대학교; [1]한밭대학교
(chshin@chungbuk.ac.kr*)

The catalytic properties of the proton form of seven different small-pore aluminosilicate zeolites (levyne, MCM-35, sigma-1, UZM-5, SSZ-13, SSZ-16, and rho), together with the silicoaluminophosphate analogs (SAPO-35, SAPO-34, and SAPO-56) of some of these zeolites, are compared in the synthesis of methylamines. Among themolecular sieves studied here, H-SSZ-16 was found to exhibit selectivities to monomethylamine and dimethylamine comparable to those of H-rho, the most widely studied catalyst for this reaction, at about 90% methanol conversion (NH3/MeOH = 1.0). However, nogood stability is observed over even these two small-pore zeolites, while the absence of strong acids sites in silicoaluminophosphate materials appears to be an inherent drawback in terms of theirapplication as amination catalysts. The overall results of thisstudy lead us to conclude that the pore dimensionality, 8-ring cage volume, number and strength of acid sites, and thermal stability of small-pore materials, as well as their 8-ring pore dimension, are of considerable importance in achieving high amination activity and selectivity.