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ZSM-5, Y, and Mordenite Zeolites as Sensing Materials for Ethanol Vapor ANUVAT SIRIVAT, INTIRA YIMLAMAI, The Petroleum and Petrochemical College, Chulalongkorn University — The effects of the framework type, the charge balancing cation type, and the Si/Al ratio of ZSM-5, Y, and Mordenite zeolites on the electrical conductivity responses towards ethanol vapor have been investigated. All zeolites were characterized using XRD, FT-IR, SEM, TGA, BET, and NH₃-TPD techniques. For the effect of the framework type, H⁺Y has a higher electrical conductivity sensitivity value than that of H⁺MOR because of a greater pore volume and available surface area. For the effect of the charge balancing cation, all NH₄⁺ZSM-5 zeolites (Si/Al = 23, 50, 80, 280) show negative responses, whereas the H⁺Y zeolites (Si/Al = 30, 60, 80) and the H⁺MOR zeolites (Si/Al = 30, 200) show positive responses. These differing behaviors can be traced to the interactions between ethanol molecules and the reactive sites of the zeolites. For the effect of Si/Al ratio, the electrical conductivity sensitivity towards the ethanol decreases with increasing Si/Al ratio or decreasing Al content, and there is a lesser degree of interaction between ethanol molecules and the active sites of the zeolites. The interactions between the ethanol molecules and the zeolites were investigated through infrared spectroscopy.

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