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Temperature-Dependent Electrical Conductivity Measurements on Hydrated and Alkali-metal Intercalated Zeolite LTA and FAU KENJI YUMOTO, YOSHINORI SUZUKI, NOBORU WADA, Fac. of Eng., Toyo Univ. — Zeolite LTA and FAU films were made from zeolite powders using a hydrothermal method. Electrical conductivity measurement were performed on the zeolite films in temperature range between 180 K and 430 K, using an LCR meter with the sweeping frequency varied from 20 to 1 MHz and drawing the Cole-Cole plots. The resistivities of both hydrated LTA and FAU zeolites increased with increasing the sample temperature from RT to 430 K, which might be caused by loss of water molecules from the pores of zeolite crystals. Also, the resistivities increased with decreasing the sample temperature from RT to 180 K, probably caused by freezing of water molecules in the zeolite. When the dehydrated zeolite samples were intercalated with alkali metals (Rb and K), the resistivities of the samples did not vary much at RT. However, the resistivities of the intercalated zeolite films decreased drastically by four orders of magnitude when the sample temperature was varied from RT to 180 K. We speculate that the dynamics of alkali atoms in the zeolite pores (electron-phonon scattering) may be responsible for the drastic change in the electrical conductivity.

Noboru Wada
Fac. of Eng., Toyo Univ.

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