

论文

NaA沸石离子交换过程的介电弛豫谱研究

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摘要:

在40 Hz~110 MHz频率段对不同Ca²⁺交换度的NaA沸石堆积体系进行了介电测量, 并利用Cole-Cole公式及Hanai方法对介电参数和相参数进行拟合与解析. 结果表明, 随着Ca²⁺交换度的不断增高, 堆积体系的介电增量、弛豫频率、弛豫分布系数以及粒子的电导率均有不同程度的降低, 而粒子的介电常数保持不变. 通过综合分析弛豫变化规律与离子交换度的内在联系发现, 离子交换后Ca²⁺选择六元环占位, 同时六元环和八元环位置的相邻2个Na⁺被置换; 占据六元环的Ca²⁺与八元环位置的Na⁺对沸石粒子的极化贡献等价; Ca²⁺的进入导致沸石孔道内微观电场多样化.

关键词: 介电弛豫谱; NaA 沸石; 离子交换

Dielectric Relaxation Spectroscopy Study on NaA Zeolite in the Process of Ion Exchange

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Abstract:

The dielectric properties of NaA zeolite with different ion exchange degree were measured by DRS in the frequency range from 40 Hz to 110 MHz, and Cole-Cole equation and Hanai method were used to attain the dielectric and phase parameters. The results indicate that the dielectric increment, relaxation time, relaxation time distribution parameter and conductivity of particle decrease with ion exchange degree increasing. At the same time, the dielectric constant of particle is independent on the ion exchange degree. By meaning of comprehensive dielectric analysis, the crystal lattice located by Ca²⁺ is inferred to six-ring site, Ca²⁺ at six-ring site and Na⁺ at eight-ring site are equivalent on the contribution to the polarization of zeolite particle, and the electric field becomes various with Ca²⁺ exchange.

Keywords: Dielectric relaxation spectroscopy; NaA Zeolite; Ion exchange

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