

Study on the Lithium Ion Diffusion Activity in Li_xNiO

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Abstract

The kinetic properties and thermodynamic data of lithium in mixed-conducting materials Li_xNiO have been determined by using an electrochemical galvanostatic pulse technique. It was found that the chemical diffusion coefficients of lithium in Li_xNiO ($0 < x \leq 1$) matrixes are the magnitude of $10^{-11} \sim 10^{-12} \text{cm}^2 \cdot \text{sec}^{-1}$ at room temperature. The partial conductivity and electrical mobility of lithium are $10^{-7} \text{S} \cdot \text{cm}^{-1}$ and $10^{-11} \text{cm}^2 \cdot \text{V}^{-1} \cdot \text{sec}^{-1}$, respectively. Furthermore, the standard free energy ΔG_{in} , entropy ΔS_{in} , and enthalpy ΔH_{in} for the lithium insertion into Li_xNiO were calculated and have values of $-257.93 \text{KJ} \cdot \text{mol}^{-1}$, $0.61 \text{KJ} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$, and $-78.25 \text{KJ} \cdot \text{mol}^{-1}$, respectively, at the stoichiometric composition of LiNiO .

Key words: Li_xNiO , chemical diffusion coefficient, kinetic and thermodynamic parameter.



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