

NMR study on Ion Dynamics in Electrode Materials for Ion secondary battery

Professor Koichi Nakamura

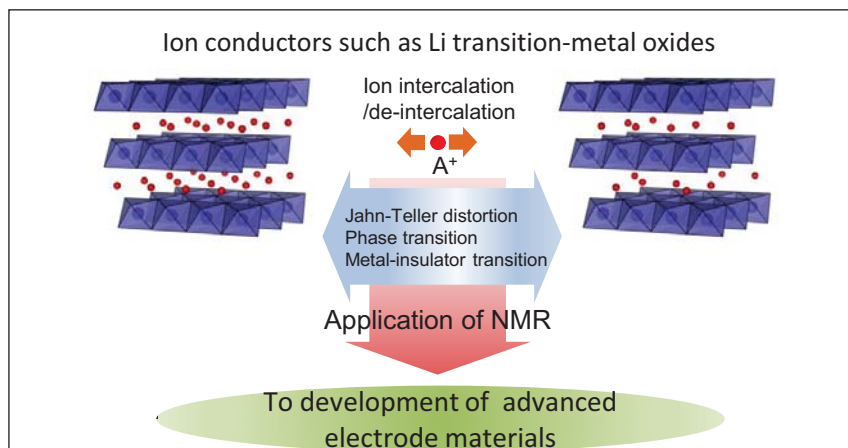


Fig.1 An approach to understanding of ion dynamics with microscopic technique.

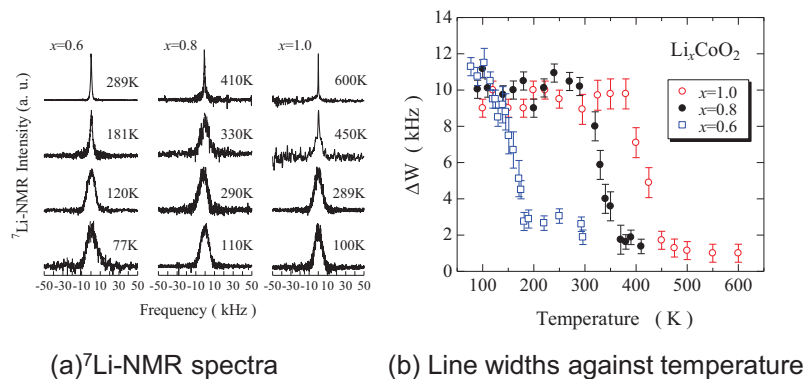


Fig.2 Temperature dependence of ⁷Li-NMR spectra in Li_xCoO₂. [1]

[1] K.Nakamura *et al.*, Solid State Ionics 177(2006)821.

Content:

Energy device materials such as ion secondary battery and fuel cell are key materials for sustainable energy resource. Conventional electrical measurement technique is microscopically inadequate to study electrochemical reaction. In special, microscopic insights for ion intercalation/de-intercalation are required to develop electrode materials for advanced battery with highly controlled structure.

NMR is a powerful tool to study local ion dynamics and electronic state in electrode materials because of probing nucleus directly. ⁷Li-NMR spectra are dependent on Li content and temperature as shown in Fig. 2. These changes in spectra are strongly connected with Li⁺ ion motion in Li_xCoO₂ and are microscopically able to answer electrochemical behaviors of electrode materials.

We aim to understand diffusion mechanism and ionic conducting behavior in various ion conductors with NMR technique.

Keywords: Ion conductivity, NMR, Ion secondary battery

E-mail: koichi@pm.tokushima-u.ac.jp

Tel. +81-88-656-7577

Fax: +81-88-656-7577

