

## BFA10

### Effect of Interaction between Lithium Ions on Lithium Intercalation into $\text{Li}_{1+\delta}[\text{Ti}_{5/3}\text{Li}_{1/3}]\text{O}_4$ Electrode

### $\text{Li}_{1+\delta}[\text{Ti}_{5/3}\text{Li}_{1/3}]\text{O}_4$ 전극내의 리튬 인터칼레이션에 미치는 리튬 이온들간의 상호작용의 영향

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Lithium intercalation into  $\text{Li}_{1+\delta}[\text{Ti}_{5/3}\text{Li}_{1/3}]\text{O}_4$  electrode was investigated from the thermodynamic and kinetic view points by using galvanostatic intermittent titration technique (GITT) and potentiostatic current transient technique with the aid of Monte Carlo simulation. The electrode potential vs. lithium content curve experimentally measured showed a wide potential plateau, indicating the coexistence of Li-poor phase  $\alpha$  and Li-rich phase  $\beta$  due to the attractive interaction between lithium ions. Considering the attractive interaction based upon a lattice gas model, the electrode potential vs. lithium content curve was theoretically calculated by using the Monte Carlo simulation to compare with that curve experimentally measured. At a potential step encountering the plateau potential, the current transient experimentally measured exhibited a 'current plateau'. The experimental current transient was in good agreement in value and shape with the theoretical current transient calculated under the assumption of 'cell-impedance' controlled lithium transport by Monte Carlo simulation. The occurrence of the current plateau in both current transients experimentally measured and theoretically calculated was analysed in terms of lithium transport in the coexistence of two phases due to the attractive interaction between lithium ions.

#### References

1. H.-C. Shin, S.-I. Pyun, S.-W. Kim and M.-H. Lee, *Electrochim. Acta* 46 (2001) 897.
2. S.-W. Kim and S.-I. Pyun, *Electrochim. Acta* 46 (2001) 987.