**BT05**

# Effect of the Pore Structure on Lithium Transport through the Mesoporous $V_2O_5$ Electrode in terms of Fractal Geometry

## 프랙탈 기하학을 이용한 메조기공성 $V_2O_5$ 전극 내로의 리튬 이동에 미치는 기공 구조의 영향에 관한 연구

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The effect of the pore structure on lithium transport through the mesoporous $V_2O_5$ film electrode was investigated in terms of fractal geometry using nitrogen gas adsorption method, potentiostatic current transient technique and ac-impedance spectroscopy. For this purpose, the mesoporous $V_2O_5$ film was electrochemically deposited in a water-ethanol solution of $VOSO_4$ and non-ionic polymer surfactant. From the analyses of the nitrogen gas adsorption/desorption isotherms obtained from the mesoporous $V_2O_5$ specimens prepared with different amounts of non-ionic surfactant, it was found that the average pore diameter and the broadness of pore size distribution increase with increasing amounts of the non-ionic surfactant, which is attributable to more aggregation of non-ionic surfactant molecules. In addition, it was also noted that the surface fractal dimension of the pore determined by using the multilayer gas adsorption theory decreases with increasing amounts of the non-ionic surfactant. From these results, it was suggested that as the surfactant-templated pores comprising the $V_2O_5$ film agglomerate, the surface fractal dimension of that pore surface decreases. In addition, on the basis of fractal geometry, the current transients and the ac-impedance spectra measured from the mesoporous film electrodes with different pore structures have been examined to quantitatively discuss the effect of the pore structure on lithium transport through the mesoporous $V_2O_5$ film electrode.

## References

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