

## Pore Volume Expansion of Ordered Mesoporous Carbon and the Effect on Lithium Sulfur Batteries' Performance

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Lithium-Sulfur Batteries (LSBs) have recently received a lot of attention because they provide high gravimetric capacity and theoretical energy density, ranging up to a factor of five beyond conventional Lithium-Ion Batteries (LIBs). However, LSBs have not yet been commercialized due to dissolution of lithium polysulfides in the electrolyte leading to loss of active materials.

Here, we deal with ordered mesoporous carbon (OMC) treated with phosphoric acid as the cathode material. Because phosphoric acid made additional micropores in the OMC framework, it leads to pore volume expansion. As a result, the treated OMC material could load the larger amount of sulfur. In addition, the small sized pores are expected to trap the lithium polysulfides strongly, decreasing the dissolution phenomenon. To synthesize the OMC, we used nano-replication method. By melting sulfur with the OMC at 160°C, carbon/sulfur composite was prepared. The synthesized materials were investigated by X-ray diffraction, N<sub>2</sub> sorption isotherms, electron microscopy and standard electrochemical technique.