

**Durable and Water Manageable Ordered
Mesoporous Supports for Polymer Electrolyte
Fuel Cells**

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The low durability of polymer electrolyte fuel cells (PEFCs) is the most considerable technical barrier for commercialization. One of the major reasons for degradation of performance is improper water management produced by oxygen reduction reaction (ORR) at the cathode. Flooding and drying out are main degradation mechanisms under improper water management. In this study, we are focused on durable and water manageable electrocatalyst supports through modification of pore structures. Bimodal mesoporous carbon with controlled pore size was prepared using two kinds of silica templates; silica sphere for mesopores and SBA-15 for micropores. Mesopores (~40 nm) act as channels for reactant transport and catalytic site for active metals. Micropores (~5 nm) play an important role in water management under flooding and drying conditions as fast adsorption of water under flooding and slow desorption of water under drying out due to capillary condensation.