Title : Development of Sheet-Like Anthraquinone Porous Organic Polymer Prepared by Nano-Interfacial Azo Coupling Polymerization for Energy Storage Materials

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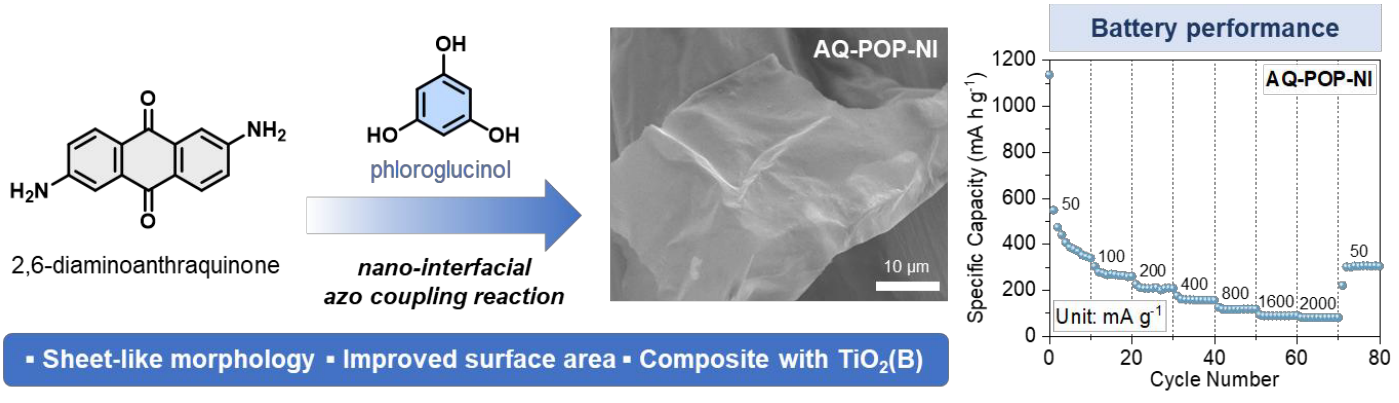
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ABSTRACT

Organic electrode materials for lithium-ion batteries are attractive due to their tunable redox chemistry, reliance on earth-abundant elements (e.g., C, H, O, and N), and potential for lightweight, low-cost, and sustainable electrodes. Our group previously synthesized anthraquinone-based porous organic polymers (AQ-POPs) via azo coupling polymerization; however, these materials predominantly exhibited aggregated morphologies. Herein, a nano-interfacial azo coupling polymerization is envisioned to synthesize an AQ-POP with a sheet-like morphology (AQ-POP-NI), as confirmed by electron microscopy. Nitrogen adsorption–desorption analysis revealed an improved specific surface area (22 m^2 g^{-1}) compared to the conventional AQ-POP (18 m^2 g^{-1}), along with a well-defined pore size distribution. Electrochemical evaluation in CR2016 coin cells demonstrated that AQ-POP-NI exhibits comparable rate capability and galvanostatic charge–discharge (GCD) performance relative to AQ-POP. Furthermore, the nano-interfacial synthesis approach was extended to fabricate AQ-POP-NI/TiO_2(B) composites that enhanced electrochemical properties of TiO_2(B). The effects of morphology control and composite formation on electrochemical performance will be discussed. Overall, this work presents a practical strategy for morphology control of AQ-POP electrodes and their TiO_2(B) composites, providing new insights into morphology-driven battery performance.



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