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Asymmetric Supercapacitors with Dominant Pseudocapacitance in Neutral Aqueous Electrolyte YUANBING MAO, QIANG LI, University of Texas-Pan American — Electrochemical capacitors (ECs) are promising power sources for portable electronics and hybrid electric vehicles. To solve the poor ionic conductivity, intrinsic inflammability and toxicity issues of current ECs incorporating organic electrolytes, aqueous electrolyte-based asymmetric supercapacitors (ASCs) have been attracting intensive attention recently. In this presentation, prototype MnO_2-NFs//KCl//CNTs supercapacitor cells in neutral aqueous electrolyte allow rapid charge/discharge kinetics, fast ionic response, and evident pseudocapacitive dominance due to the unique MnO_2-NF architecture and novel ASC design. For the first time, the respective contributions of the pseudocapacitance and EDL capacitance to the overall electrochemical performance of ASCs were differentiated with a proof of pseudocapacitive dominance ($q_{\text{pseudo}}/q_{\text{dl}} = 2.5$). To sum, this study provides a brilliant proof-of-concept design of novel supercapacitors with pseudocapacitive dominance to achieve ultimate energy storage applications with both high energy and power density.

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