Supercapacitive Properties of Activated Carbon-Quinone Derivative Composite Electrode in Different Hydrogen ion Conducting Electrolytes

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A composite electrode (CE) consisting of activated carbon and quinone derivative 2-((2-(1*H*-indol-3-yl) ethyl) amino) naphthalene-1, 4-dione (HBU-551) was probed in different hydrogen ion conducting electrolytes such as sulfuric acid (H₂SO₄), hydrochloric acid (HCl), Phosphoric acid (H₃PO₄) and ammonium chloride (NH₄Cl). The electrochemical performances of the CE in the electrolytes were investigated by cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS) and charge-discharge. The different hydrogen ion conducting electrolytes with different ionic conductivity induce different electrochemical properties in the CE. The specific capacitance is in the order of H₂SO₄ > H₃PO₄ > HCL > NH₄Cl at 100 mV/s and a potential range of -0.2 - 0.8 (V vs Ag/AgCl).

Keywords: Quinone derivative, composite electrode, proton conducting electrolyte, supercapacitor

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