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Characteristics of Electric Double Layer Capacitors Prepared with Electrolytes Based on Deep Eutectic Solvents

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Resumo:

The storage capacity of electric double layer capacitors or electrochemical supercapacitors with electrolytes based on deep eutectic solvents (DES) composed of L-lactic acid with several hydrogen bond acceptors (nicotinamide, L-alanine, ammonium acetate, sodium acetate, choline chloride, amino acetic acid) with a molar ratio of 7:1 have been investigated. A DES based on urea and choline chloride with at a molar ration of 2:1 has also been included for comparison. The electrochemical supercapacitors were prepared using commercial activated carbon electrodes after removing the volatile organic electrolyte with a vacuum pump. The characteristics of the electrochemical supercapacitors were determined by cyclic voltammetry at temperature room temperature and also after heating at 353 K using scan rates that varied from 2 to 25 mVs⁻¹. Lowest scan rate led to higher specific capacitance of 150±8 Fg⁻¹ with a maximum applied potential of 1.7 V for the urea and choline chloride DES with a molar ration of 2:1. The lactic acid with all the hydrogen bond acceptors with a molar ratio 7:1 it has been necessary to increase the temperature above room temperature to improve the specific capacitance.