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KOH-activated carbon aerogels derived from sodium carboxymethyl cellulose for high-performance supercapacitors and dye adsorption

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ABSTRACT

In this paper, we present a facile and eco-friendly approach for the synthesis of porous carbon aerogels by sol-gel processing, freeze-drying, and pyrolysis of sodium carboxymethyl cellulose aerogels. The obtained carbon aerogels were further treated via a KOH activation process. The results showed that the as-prepared carbon aerogels exhibited a high specific surface area of 428 m²/g after KOH activation for 3 h. The highly porous and interconnected three-dimensional nanostructure provided efficient migration of electrolyte ions and electrons, and thus the activated carbon aerogels exhibited excellent electrochemical performance for supercapacitors. The specific capacitances reached 152.6 F/g at a current density of 0.5 A/g within a potential window of -1.0 to 0 V in a 6 M KOH solution. In addition, the carbon aerogels showed excellent adsorption capacity for methylene blue and malachite green, which reached 249.6 mg/g and 245.3 mg/g, respectively. The excellent electrochemical performance and adsorption capacities showed the carbon aerogels to

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