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One-pot synthesis of biochar wrapped Ni/NiO nanobrick composites for supercapacitor applications

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The present study demonstrates a novel approach by which porous brick like nanostructures of nickel oxide can be prepared following a combustion assisted route. The as synthesized NiO active material is electrophoretically deposited on porous Ni foils and processed into high-surface area thin film electrodes for supercapacitor applications. A detailed study has been performed to elucidate how surface nanomorphology and porosity can impact the pseudocapacitive performances of NiO electrode. From the analysis of the relevant electrochemical parameters, an intrinsic correlation between the electrode performances and these parameters has been deduced and explained. According to single electrode studies the electrodes exhibited a specific capacitance value as high as 1058 F/g at 5 mV/s with good cyclic stability.

Keywords: Nickel oxide, Biochar, Pseudocapacitor, Cellulose

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