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Ramalingam et al.

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- (54) **METHOD OF MAKING A POROUS NANO-CARBON ELECTRODE FROM BIOMASS**
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B05D 5/12 (2006.01)

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(58) **Field of Classification Search**
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See application file for complete search history.

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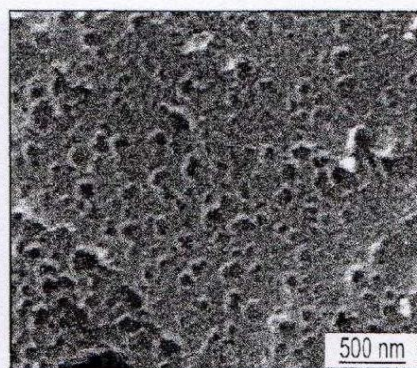
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(57) **ABSTRACT**

The method of making a porous carbon electrode is a chemical activation-based method of making a porous nano-carbon electrode for supercapacitors and the like. Recycled jackfruit (*Artocarpus heterophyllus*) peel waste is used as a precursor carbon source for producing the porous nanocarbon. A volume of jackfruit (*Artocarpus heterophyllus*) peel is collected, dried and then heated under vacuum to produce precursor carbon. The precursor carbon is mixed with phosphoric acid (H₃PO₄) to form a mixture, which is then stirred, dried and heated to yield porous nanocarbon. The porous nanocarbon is mixed with a binder, such as poly(vinylidene difluoride), acetylene black, and an organic solvent, such as n-methyl pyrrolidinone, to form a paste. This paste is then coated on a strip of nickel foil to form the porous carbon electrode.

8 Claims, 12 Drawing Sheets





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(54) **METHOD OF MAKING A SUPERCAPACITOR USING POROUS ACTIVATED CARBON FROM COW DUNG**

(56) **References Cited**

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(57) **ABSTRACT**

The method of making a supercapacitor using porous activated carbon from cow dung includes converting cow dung to porous activated carbon by, in a first step, preparing the dung waste by washing and drying the dung waste, and heating the dung waste in a vacuum environment to form pre-carbonized carbon. In a second step, the pre-carbonized carbon is impregnated with phosphoric acid to form a slurry, which is dried, ground, and heated in a vacuum to between 600-900° C. to form porous activated carbon. The porous activated carbon is mixed with a binder, acetylene black, and an organic solvent to form a paste, which is dried on a conductive metal foil to form an electrode. Two such electrodes (an anode and cathode) are coated with an electrolyte gel (e.g., aqueous potassium hydroxide) and separated by a polymer (e.g., PTFE) membrane to form the supercapacitor.

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(58) **Field of Classification Search**
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See application file for complete search history.

14 Claims, 15 Drawing Sheets

