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Synthesis of Nanoporous Carbon with New Activating Agent for high-performance Supercapacitor

Thileep Kumar Kumaresan^a, Sivagaami Sundari Gunasekaran^a, Senthil Kumar Elumalai^a, Ashwini Ashok^a, Ramya Meganathan^a, Varsha Pawar^a, Kalaivani Raman^a, ShanmugarajAndikkadu Masilamani^b, Kumaran Vediappan^c, Gnanamuthu Ramasamy^c, Smagul Zh. Karazhanov^d, Raghu Subashchandrabose^{b*}

^aDepartment of Chemistry, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, Tamil nadu, India - 600 117.

^bCentre for Advanced Research & Development (CARD), / Chemistry, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, Tamil nadu, India - 600 117.

^cSRM University, Department of Chemistry, Kattankulathur-603203.

^dInstitute for Energy Technology, P.O Box 40, NO 2027-Kjeller, Norway.

*Corresponding author email ID: subraghu_0612@yahoo.co.in.

Abstract:

In the present work, we report a new activating agent (NaCl: KCl) (1: 1) for the synthesis of nanoporous carbon from Java Kapok tree shell (1:1) with different controlled temperature under inert atmosphere. Additionally, surface morphology, physico-chemical and electrochemical properties of the nanoporous carbon are characterized. The obtained Kapok shell derived nanoporous carbon possessed a large surface area of $1260 \text{ m}^2 \text{ g}^{-1}$, pore volume of $0.439 \text{ cm}^3 \text{ g}^{-1}$, pore size of 1.241 nm, and microspore volume of $0.314 \text{ cm}^3 \text{ g}^{-1}$. The nanoporous carbon-based electrode material exhibited higher capacitance of 169 F g^{-1} with 97% capacity retention after 10,000 cycles at 1 Ag^{-1} . We believe that this new activation agent can be significant contribution in the new carbon technology for energy storage materials.

Keywords: Biomass, Activated Carbon, Cyclic Voltammetry, Supercapacitors

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