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#### Application Details

APPLICATION NUMBER	202141012943
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	25/03/2021
APPLICANT NAME	1 . Institute of Aeronautical Engineering 2 . Dr.Kamatam Hari Prasad
TITLE OF INVENTION	GRAPHITIC CARBON DERIVED FROM WASTE TISSUE PAPERS FOR SODIUM-ION CAPACITORS AND THEIR PREPARATION METHOD THEREOF
FIELD OF INVENTION	ELECTRICAL
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E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	02/04/2021

#### Application Status

APPLICATION STATUS	<b>Awaiting Request for Examination</b>
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➡ Filed ➡ Published ➡ RQ Filed ➡ Under Examination ➡ Disposed

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### Patent Search

Invention Title	GRAPHITIC CARBON DERIVED FROM WASTE TISSUE PAPERS FOR SODIUM-ION CAPACITORS AND THEIR PREPARATION METHOD THEREOF
Publication Number	14/2021
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Application Number	202141012943
Application Filing Date	25/03/2021
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Priority Date	
Field Of Invention	ELECTRICAL
Classification (IPC)	H01M0010054000, H01M0004587000, H01M0004580000, H01M0004136000, H01M0004020000

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**Abstract:**

ABSTRACT: Title: Graphitic Carbon Derived from Waste Tissue Papers for Sodium-Ion Capacitors and Their Preparation Method Thereof The present disclosure proposes recycle paper based sustainable graphitic carbon nanosheets as competent anode material that enhances conductivity and energy storage capacity of sodium-ion capacitors. The graphitic carbon electrode used in hybrid sodium-ion capacitors is cost-effective and provides high power density. The proposed sustainable method reduces tissue paper waste and recycles it to make battery-type and capacitive-type electrode materials for the overall enhancement of electrochemical energy storage. The electrode made of sodium reduces the overall cost of the hybrid sodium-ion capacitor. The sodium-ion rich electrolyte helps in ion conductivity, prevents capacity fading, and results in a longer cycle-life. The proposed eco-friendly method is less hazardous and time-saving.

#### Complete Specification

Claims:CLAIMS:

I / We Claim:

1. A method for synthesis of graphitic carbon derived from waste tissue papers for hybrid sodium-ion capacitors, comprising:  
 washing a waste tissue paper with deionised water, and leaching in dilute hydrochloric acid for 24 hours to obtain an acid leached tissue paper;  
 washing said acid-leached tissue paper repeatedly with deionised water and ethanol to remove said hydrochloric acid from said acid-leached tissue paper, and drying for 24 hours to obtain dried tissue paper;  
 burning said dried tissue paper to obtain black carbon ash followed by refining and grinding said black carbon ash;  
 exfoliating said ground black carbon ash with different amounts of sodium dodecyl sulphate (SDS) to obtain a black carbon ash-SDS mixture;  
 treating said black carbon ash-SDS mixture with the deionised water and ethanol for 5 hours of sonication to obtain a black sonicated black carbon ash-SDS mixture, followed by centrifugation of said black sonicated black carbon ash-SDS mixture;  
 filtering said black sonicated black carbon ash-SDS mixture with a filter paper and drying black said sonicated black carbon ash-SDS mixture at 60 °C for 24 hours to obtain graphitic carbon sheets;  
 mixing said graphitic carbon sheets with polyvinylidene fluoride binder, and conductive additive in a solvent to obtain a homogenous anode material;  
 coating said homogenous anode material on a carbon cloth, and drying said carbon cloth at 60 °C to obtain a graphitic carbon anode of said hybrid sodium-ion capacitor.  
 whereby said waste tissue paper based sustainable graphitic carbon for said hybrid sodium-ion capacitors provides enhanced conductivity and energy storage capacity

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<b>FORM 1</b> THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 <b>APPLICATION FOR GRANT OF PATENT</b> (See section 7, 54 and 135 and sub-rule (1) of rule 20)				<b>(FOR OFFICE USE ONLY)</b>			
				Application No.:			
				Filing Date:			
				Amount of Fee Paid:			
				CBR No.:			
				Signature:			
<b>1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)</b>							
<b>2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]</b>							
Ordinary (✓)		Convention ( )		PCT-NP ( )			
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )		
<b>3A. APPLICANT(S)</b>							
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				City	Hyderabad		
				State	Telangana		
				Country	India		
				Pin code	500043		
<b>3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]</b>							
Natural Person ( )		Other than Natural Person					
		Small Entity ( )		Startup (✓)		Others ( )	
<b>4. INVENTOR(S) [Please tick (✓) at the appropriate category]</b>							
Are all the inventor(s) same as the applicant(s) named above?			Yes ( )			No (✓)	
If "No", furnish the details of the inventor(s)							
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		Country	India
		Pin code	751004

**5. TITLE OF THE INVENTION**

Graphitic carbon derived from waste tissue papers for sodium ion capacitors and their preparation method thereof

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**8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION**

Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)

**9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)**

International application number	International filing date

**10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION**

Original (first) application No.	Date of filing of original (first) application

**11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT**

Main application/patent No.	Date of filing of main application

**12. DECLARATIONS:**

**(i) Declaration by the Inventor (s)**

(In case the applicant is an assignee: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

I/We, the above named inventor(s) is/are the true & first inventor(s) for this invention and declare that the applicant(s) herein is/are

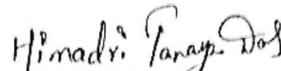
my/our assignee or legal representative.

(a) Date: 20.03.2021

(b) Signature(s):



(c) Name(s): Dr. Kamatam Hari Prasad

  
Dr. Himadri Tanaya Das

(ii) Declaration by the applicant (s) in the convention country

(In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date

(b) Signature(s)

(c) Name(s) of the signatory

(iii) Declaration by the applicant(s)

I/We the applicant(s) hereby declare(s) that: -

- I am/ We are in possession of the above-mentioned invention.
- The provisional/complete specification relating to the invention is filed with this application.
- The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.
- There is no lawful ground of objection(s) to the grant of the Patent to me/us.
- I am/we are the true & first inventor(s).
- I am/we are the assignee or legal representative of true & first inventor(s).
- The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).
- I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/We derive the title.
- My/our application in India is based on international application under Patent Cooperation Treaty(PCT) as mentioned in Paragraph-9.
- The application is divided out of my /our application particulars of which is given in Paragraph-10 and prays that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.
- The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

### 13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

a) Form 2

Item	Details	Fee	Remarks
Complete/ provisional specification)#:	No. of pages:		
No. of Claim(s):	No. of pages:		
Abstract:	No. of pages:		
No. of Drawing(s):	No. of pages:		

# In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

- b) Complete specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).
- c) Sequence listing in electronic form
- d) Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).
- e) Priority document(s) or a request to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.
- f) Translation of priority document/Specification/International Search Report/International Preliminary Report on Patentability.
- g) Statement and Undertaking on Form 3
- h) Declaration of Inventorship on Form 5
- i) Power of Authority
- j) .....

Total fee .....in Cash/ Banker's Cheque /Bank Draft bearing No.....Date.....on  
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I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters stated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this 20<sup>th</sup> day of March 2021

Signature: 

Name: Hima Bindu Atti

To,  
The Controller of Patents  
The Patent Office, at Chennai

Note: -

- \* Repeat boxes in case of more than one entry.
- \* To be signed by the applicant(s) or by authorized registered patent agent otherwise where mentioned.
- \* Tick (✓)/cross (x) whichever is applicable/not applicable in declaration in paragraph-12.
- \* Name of the inventor and applicant should be given in full, family name in the beginning.
- \* Strike out the portion which is/are not applicable.
- \* For fee: See First Schedule";