Contribution ID: **240** Type: **Oral Presentation**

Analyses of the Pore Structure Formation of Activated Carbon from Compactivation of Plant Biomass Waste for Electrochemical Device Electrodes

Wednesday, 27 June 2018 12:40 (20 minutes)

The formation mechanism of the porous framework in nanostructured carbon materials is important in a wide variety of applications such as in supercapacitors, gas storage, adsorbents and catalyst supports etc. The accessibility to the pore sites by electrolyte ions and gases are highly determined by the precise synthesis techniques adopted for these materials. As such, biomass waste materials are a good choice for synthesis as they are available in abundance and cheap, while containing high carbon content and giving high specific surface area for electrochemical supercapacitor applications.
In this study, activated carbon (AC) was synthesized from renewable plant biomass waste using a chemical vapour deposition (CVD) technique via a pre-hydrothermal conversion step and compactivation along with the fine-tuning of key growth parameters, such as activating agent and carrier gas. The textural, structural and morphological features were investigated by the Brunauer-Emmett-Teller (BET) technique, X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), and Scanning/Transmission electron microscopy (SEM/TEM) characterization. The material tested in a three-electrode configuration exhibited electric double-layer capacitor (EDLC) behaviour in different electrolytes and working comfortably in KNO3 electrolyte in both negative and positive operating widow of 0.80 V. The results from this study provide the pathway into designing hierarchically porous materials from cheap and sustainable sources suitable in high power energy storage devices.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
"Call for Abstracts"
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

PhD

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
 institution and email address.

Pro. N. Manyala, Department of Physics, Institute of Applied Materials, SARCHI Chair in Carbon Technology and Materials, University of Pretoria, Pretoria 0028, South Africa.
Ncholu.Manyala@up.ac.za

Primary author: Mr TJEBANE, Tjatji (Necsa/UP)

Co-authors: Dr MOMODU, Damilola (UNIVERSITY OF PRETORIA); Dr NOTHNAGEL, Gabriel (Necsa R&D); Dr MANYALA, Ncholu (University of Pretoria)

Presenter: Mr TJEBANE, Tjatji (Necsa/UP)

Session Classification: Applied Physics

Track Classification: Track F - Applied Physics