Contribution ID: **219** Type: **Oral Presentation**

Colloidal Synthesis of Molybdenum Diselenide Nanomaterials for Supercapacitor Applications

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

Molybdenum diselenide(MoSe₂) is a layered material that has attracted a lot of interest in the scientific community; the 2D nanomaterials derived from the bulk crystals of these materials have been found to have exceptional electronic and optical properties. These properties include a high surface to volume ratio, high carrier mobility, relatively high stability and a band-gap in the visible region of the electromagnetic spectrum. One possible application for these materials is as electrode materials in supercapacitors. Supercapacitors are energy storage devices that have high power densities, high cycle stability, large operational temperature range and a higher energy density than conventional capacitors. Unfortunately, these devices suffer from low energy densities compared to batteries. To circumvent this major drawback nanomaterials are being explored as alternatives to activated carbon for use as electrode materials in supercapacitors. In this work a novel colloidal synthetic method has been developed to synthesize 2H hexagonal phase MoSe ₂ nanomaterials with a nanosheets and nanoflower morphology for supercapacitor applications. The electrochemical performance of the two morphologies were compared to determine the best suitable MoSe₂ nanomaterials morphology for the application. The MoSe₂ nanomaterials displayed electric double capacitance. The specific capacitance of the MoSe₂ nanosheets and nanoflowers was determined to be 30 Fg⁻¹ and 81 Fg⁻¹ respectively. The impedance MoSe₂ nanosheets and nanoflowers was determined to be 57.1 Ω and 34.0 Ω respectively. The nanoflowers morphology has superior electrochemical performance because the 3D interconnected nature of the nanoflowers gives them higher surface area and pore volume.

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.

Prof Nosipho Moloto
Wits university
nosipho.moloto@wits.ac.za

Primary authors: Dr MOLOTO, Nosipho (University of the Witwatersrand); Ms GQOBA, Siziwe (Wits university); Mr NDALA, Zakhele (Wits university)

Presenter: Mr NDALA, Zakhele (Wits university)

Session Classification: Physics of Condensed Matter and Materials

Track Classification: Track A - Physics of Condensed Matter and Materials