Journal of
Chemical Biology & Pharmaceutical Chemistry

Abstract

Graphene Quantum Dots based Polymer Composite for Energy Device Application

Devendrappa H
Mangalore University, India

Abstract:

A new carbon based material, Graphene quantum dots (GQDs) is becoming an advanced multifunctional material for its novel chemical / physical properties including nanometer size, good electrical conductivity, abundant edge defects, high mobility, stable photoluminescence and better photoelectric properties making them promising for various energy storage and conversion devices. The glucose derived water soluble crystalline GQDs with uniform size less than 7nm are synthesized by using microwave assisted hydrothermal method. GQDs composite with conjugate polymers was successfully synthesized in situ chemical polymerization, they have exhibiting superior optical, electrical and electrochemical properties are encourages for various application in energy storage devices. To fabricated double layer electrode of PPY- GQDs composite and observed a high specific capacitance, good stability. The obtained composites were characterized using FT-IR to study the chemical interaction, Surface morphology of prepared samples was investigated using FESEM, and Optical properties were studied using UV-Visible spectroscopy. The application of the PGC composites is evaluated as a supercapacitor material by using CV and galvanostatic charging discharging techniques. The specific capacitance of composite film was 228.7F/g shows that reported electrodes has faster power response capacity and better cycle stability. Obtained results shows high specific capacitance and good stability of polymer nanocomposite may encourage the promising application in high performance energy storage devices.

Biography:

Dr. Devendrappa H is a young professor, Department of Physics, Mangalore University, Mangalore-Karnataka (India). He has completed Master degree physics (Solid State Physics as a specialization) and obtained his Ph.D. on research title "Transport & Electrochemical property of Polymer composite" from the Gulbarga University, Gulbarga (India) in 2002. In 2004 he has joined as assistant professor in the Department of Studies in Physics, Mangalore University and presently he is professor in the same place. He has established the solid state polymer research laboratory by set up with major equipment's interface with computer like CHI Electrochemical Workstation, Wanye Kerr Impedance Analyzer, Perkin Elmer Ultraviolet Absorption Spectroscopy, Alpha Brucker Fourier Transform Infrared, Keithyl Electrometer and minor equipment under various research projects and has completed five major research projects as a principal investigator of worth amount $12.4 million USD (INR 1.24 Cr) funded by the Government of India (BRNS, UGC, DST, and SERB funding agencies). He has successfully guided 7 Ph.D. students (awarded) and presently 8 members working as research scholars. Presently one project is going on. He has been published 39 research papers in referred peer-reviewed international journals and 41 in proceedings journals. He presented invited/oral/poster presentation of research papers in the 100 international conferences in various places in India and abroad..

Publication of speakers:

1. A paper entitled "Dielectric Constant & Transport Mechanism of Percolated PANI Nanoclay Composites" in Ind. Eng.Chem.Res. 2014,53, 16873−82 (Impact factor 2.84). Mini Vellakkat, Archana Kamath, S. Raghu, Sharanappa Chapi & Devendrappa H.

Citation: Devendrappa H; Graphene Quantum Dots based Polymer Composite for Energy Device Application; Euro Materials 2020; August 27, 2020; London, UK