

Graphene - molybdenum oxide - polyaniline based ternary nanocomposite material for supercapacitor application

K. Venkateswara Rao ^{1*}, R. Kiran Kumar Reddy ¹, Madhu nakirekanti ², Saraswathi Kailasa ¹

¹ Center for Nano Science and Technology, IST, JNTUH, Hyderabad-500072, India.

² ECE Department, Vardhaman College of engineering, Hyderabad-500072, India.

Abstract: Energy storage is one of the major concerns in the field of electrostatics. Recent advancement in nanotechnology led to the emergence of an alternative energy storage device namely Supercapacitors. Most of the research around the globe is now being carried out on how to improve their energy and power densities by developing new kind of electrode materials in order to incorporate them over a broad range of applications. An effective and friendly route is reported for preparing graphene based molybdenum oxide polyaniline (GMOP) nanocomposite using hydrothermal and in-situ polymerization method. Structural and morphological studies were carried out using XRD, Field Emission Scanning Electron Microscope, FTIR and RAMAN spectroscopy. The electrochemical performance of the synthesized materials was done employing Cyclic Voltametry, Electrochemical Impedance spectroscopy and Galvanostatic Charge-Discharge techniques in 0.1M NaOH solution using nickel mesh as bare electrode. The electrochemical studies revealed that GMOP nanocomposite material demonstrated an increase in specific capacitance than compared to individual nanomaterials (MoO₃ and GMoO₃) thereby making ternary nanocomposites a good electrode material in the preparation and fabrication of supercapacitors.

Key words: Hydrothermal method, In-situ Polymerization, GMOP ternary nanocomposite, Specific capacitance, Supercapacitors.