



PRODUCT DATA SHEET

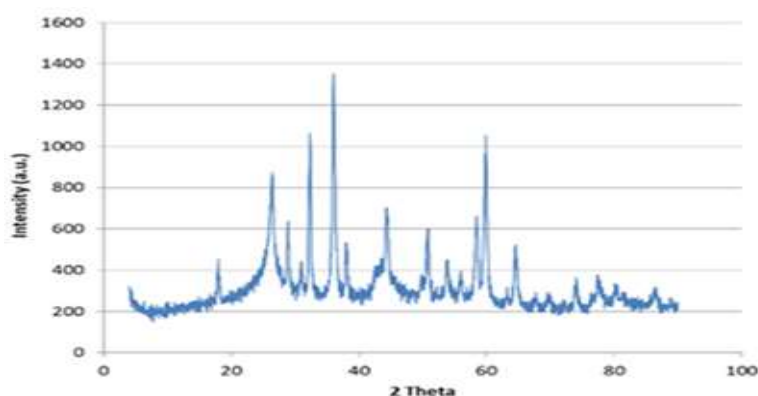
Graphene – Manganese Oxide nanoparticles

The nanocomposite has been synthesized by the formation of nanoparticles of manganese oxide in the surface of pristine graphene nanoplatelets. The product has the following composition: Mn₃O₄ / MnO₂ 20-23 %; Graphene 77-80 % and Volatiles <1%.

The addition of manganese oxide nanoparticles synthesized with Gnanomat IP confers great specific capacitance (pseudocapacitance) to pure graphene. The nanomaterial showed interesting features for applications of electrical energy storage systems as active material in supercapacitor electrodes and as a Li-ion battery anode material; and it can be used in other applications as catalyst, water purification and chemical sensing.

Gnanomat develops and tailor-made nanocomposites of carbon materials with nanoparticles and additives of different source for technologically advanced applications.

Graphene – Manganese Oxide nanocomposite	
Form	Powder
Morphology	Graphene lateral size: 40-200 nm Nano/micro particles diameter (TEM): 20 -200 nm BET Surface area: 365 m ² /g
Color	Black
Potential uses and applications*	Active material: supercapacitor electrodes and LiB anodes Water purification Chemical sensing Catalyst
Composition	Mn ₃ O ₄ / MnO ₂ 20-23 % Graphene 77-80 % Volátiles <1%

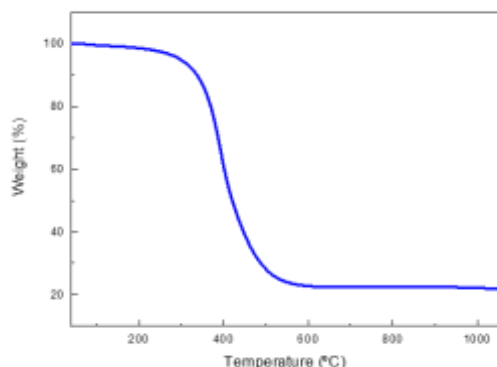


*XRD spectra

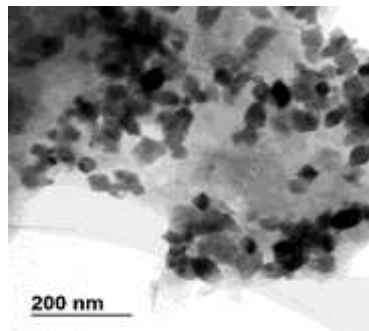




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*Thermogravimetric curve



*TEM Image

About Gnanomat

Gnanomat, your nanotech partner of choice to bring nanomaterials to Industrial applications. The Company offers a versatile range of advanced materials for technologically advanced applications.

Nanomaterials need to be tailored for each specific device and application to ensure the best performance and we establish early collaborations with clients through custom product development.

Contact us to design and optimize products that from the first moment address the customer pains and offer real solutions that can fit into your manufacturing process.

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*Application and uses references:

"Graphene based metal and metal oxide nanocomposites: synthesis, properties and their applications, Mujeeb Khan, Muhammad Nawaz Tahir, Syed Farooq Adil, Hadayat Ullah Khan, M. Rafiq H. Siddiqui, Abdulrahman A. Al-warthan and Wolfgang Tremel, J. Mater. Chem. A, 3, 18753, 2015."

"Research Progress in MnO₂-Carbon Based Supercapacitor Electrode Materials Qun-Zheng Zhang, Dian Zhang, Zong-Cheng Miao, Xun-Li Zhang, and Shu-Lei Chou. Small 2018, 1702883. DOI: 10.1002/smll.201702883"

"Synthesis of graphene-transition metal oxide hybrid nanoparticles and their application in various fields Arpita Jana, Elke Scheer and Sebastian Polarz doi:10.3762/bjnano.8.74"

"Graphene-Nanoparticle Composites and Their Applications in Energy, Environmental and Biomedical Science. Avijit Mondal and Nikhil R. Jana, Centre for Advanced Materials, Indian Association for the Cultivation of Science, Kolkata 700032, India. Reviews in Nanoscience and Nanotechnology Vol. 3, pp. 177-192, 2014."

