

23rd International Conference on
Nanomaterials and Nanotechnology
March 15-16, 2018 | London, UK

Development and structural integration of electro spun carbon Nano fibers with graphene layer structure

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Among the carbon based nanostructured materials, carbon nanofibers (CNF) has got unique prominence over the years due to excellent mechanical and electrical properties combined by its cheap and easy fabrication process. CNF with graphene structure were developed by electrospinning of PAN and subsequent post treatments under specialized conditions. The assembly of graphene layer patches on the CNF surface was realized by Raman spectroscopy and TEM. Structural integration of CNF was done under different temperatures from 800°C - 1500°C. Crystallite size, ID/IG and FWHM was evaluated afterwards via Raman peak fitting and X-ray diffraction. Results demonstrated CNF carbonized at 1500°C via two stage heat treatment process with prior external straining (creep stress) applied during the stabilization process showed emergence of symmetrical sharp 2D peak in Raman spectrum with 2D/G ratio of nearly a few layer graphene. High temperature heat treatment along with creep stress during stabilization process results in ordering of amorphous carbon and results in assembly of graphene layers on carbon fiber surface.

Biography

A B Ali is currently pursuing his PhD at Hannover School for Nanotechnology (HSN), Leibniz University Hannover. He is working on carbon nanofibers and graphene related nanostructured materials. This work is a midway research for his future work regarding novel carbon nanofibers-graphene based sensor materials under the nano-sensor version of HSN. Before HSN, he had completed his MS in Materials science from King Fahd University of Petroleum and Minerals (KFUPM), where he has worked on Tribology of Nanocomposites and published his research findings in reputed international journals related to Tribology and Polymer Composites. He has also worked at Center of Excellence in Nanotechnology (CENT), Research Institute at KFUPM.

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