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Microstructural and Electrical Properties of Graphene-Oxide (GO) Functionalized with Gold Nanoparticles (Au: NPs)

Tuesday, 26 June 2018 15:00 (2 hours)

We have synthesized Graphene-Oxide (GO) by the modified hummer's process and functionalized with gold-nanoparticles (Au-NPs) for the study of microstructure and electrical properties. We have observed from the Raman spectroscopy that the intensity of D-peak (disorder) reduced with respect to G (graphite-cluster) when GO is functionalizes with Au-NPs (r-GO: Au). Reduction of D-peak (increase of G-peak) implies the reduction of ID/IG ratio that are obtained from the Raman spectra. The reduction of ID/IG ratio (GO: 1.17 to rGO-Au: 0.95) clearly indicates that the sp2-cluster is reduced through functionalization of GO with Au-NPs. The reduction of sp2-cluster and/or enhancement of sp3-cluster is due to replacement of sp2-cluster by the Au-NPs. The reduction of sp2-cluster in the film networks are also observed from the Fourier transform infrared (FTIR) spectroscopy and are consistent with reduction of conductivity as we observe from the voltage (V) – Current (I) characteristics measurement curve. We believe that the reduction of conductivity of r-GO:Au would be most suitable Ferro-electric materials for memory storage device applications.

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