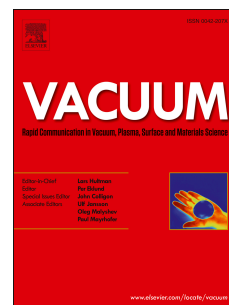


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Graphene synthesized using filtered cathodic vacuum arc technique and its applications

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Graphene synthesized using filtered cathodic vacuum arc technique and its applicationsO. S. Panwar^{a,b*}, A. K. Kesarwani^b, S. R. Dhakate^b and B. S. Satyanarayana^a^aSchool of Engineering and Technology, Large Area and Flexible Electronics Laboratory,
BML Munjal University, Sidhrawali, Gurugaon-123413, Haryana, India^bCSIR-National Physical Laboratory, Dr. K.S. Krishnan Marg, New Delhi-110012, India**ABSTRACT**

Amorphous carbon (a-C) films of varying thicknesses (0.5-18 nm) were deposited by the filtered cathodic vacuum arc technique on Ni/SiO₂/Si substrate and then annealed in vacuum at 800°C for 15 min and cooled down to room temperature to obtain graphene. The samples were characterized by Raman spectroscopy, transmittance, high resolution transmission electron microscope (HRTEM), optical microscopy and atomic force microscopy. Raman spectra showed that the values of I_{2D}/I_G , I_D/I_G and full width at half maximum of D and 2D peaks were in the range 0.18-0.51, 0.82-1.02, 104-208.1 cm⁻¹ and 101.2-128.0 cm⁻¹, respectively, for varying thicknesses of graphene. The transmittance decreases from 97 to 63.7% with the increase in thickness of prepared graphene film. The mobility of ~ 725.4 cm²/V.s of field effect transistor using graphene synthesized from a-C film of 3 nm thickness has been obtained. HRTTEM and AFM image revealed monolayer graphene synthesized from a-C film of 1 nm thickness.

Keywords: Graphene, Filtered cathodic vacuum arc, Raman, Transmittance, HRTEM, Field effect transistor

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