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Remote Plasma Enhanced –Chemical Vapor Deposition (rPE-CVD) of Graphene on Various Substrates

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Mechanical exfoliation of highly oriented pyrolytic graphite (HOPG) has been the most common method of producing single layers of graphene. However, the lateral dimensions of monolayer samples are typically limited to the micro-scale. Since large area graphene films on insulating substrates are required for practical applications, several techniques have been explored such as chemical vapor deposition (CVD) on transition metals, graphitization of SiC wafers under high vacuum, and reduction of oxidized graphite films.

Plasma Enhanced Chemical Vapor Deposition (PE-CVD) [1-3] makes the deposition method more tunable as it allows for an independent control of the reaction
parameters and the growth parameters, which should lead to a better control of the size and shape of the nanostructures. Moreover, converting the precursor gas into a plasma state involves, by definition, a higher amount of active carbon radicals in the reaction process and thus enhances the deposition rate. By means of using a highly reactive deposition technique such as a hydrocarbon plasma, one can decrease the exposure time and/or decrease the substrate temperature. This latter feature opens the deposition process towards a wider variety of substrates with lower melting points. Last but not least, a remote plasma is –by definition - generated at a distance from the substrate, thus minimizing preferential perpendicular growth directions that the electrical fields may induce in a traditional plasma setup.

CELLS-ALBA together with ibss Group, Inc. has adapted the GV10x downstream inductively coupled RF plasma source typically used for cleaning hydrocarbon contaminated from SEM chambers to also remove carbon deposits on optical precision surfaces [4]. For these applications the feedstock gas of the plasma consists of a chemically active agent such as oxygen or hydrogen converting carbon into CO2, CO, or hydrocarbons gas via a corresponding oxidation or reduction process, respectively.

References

[1] Y. B. Zhang, Y. W. Tan, H. L. Stormer, and P. Kim. Nature (London) 438, (2005), 201.

[2] T. Otha, A. Bostwick, T. Seyller, and K. Horn, Science 313, (2006), 951.

[3] Gopichand Nandamuri, Sergei Roumimov, and Raj Solanki. App. Phys. Lett. 96, (2010), 154101.

[4] M. González Cuxart and E. Pellegrin, rPECVD of graphene on various substrates, thesis corresponding to the Master in "Nanotechnology and Materials Science", Universitat Autònoma de Barcelona and ALBA-CELLS (2014).

Caption (s) - Add figures as attached files (2 fig. max)

Figure 1: SEM image of one of our graphene samples. Figure 2: Raman spectra corresponding to some of our graphene samples.

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