CVD graphene synthesis, fabrication & characterization for applications

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Abstract

Single layer graphene (**SLG**) films offer several features such as i) a wide range of non-covalent molecular functionalization [1], ii) high field effect mobility & current density (~6x10^3 cm^2/Vs, 300 K) [2, 3], iii) transparency (~97% to visible light), iv) flexibility & high mechanical strength (~1 TPa). Using chemical vapor deposition (**CVD**), mass-production of graphene films for industrial applications is achievable today. Current progress in standardization of graphene & 2D material quality is encouraging towards industrial applications using graphene films such as low-cost diagnostic kits.[4] In this poster, we present the progress in CVD graphene synthesis and film quality characterization (see: figure 1) using Raman spectroscopy. Second, functionalization of the graphene surface using two types of molecular linkers is performed to assess potential applications of graphene films. Third, a novel approach for CVD heterostructure formation using CVD graphene & CVD hexagonal Boron Nitride (**hBN**) is presented. Such heterostructure are explored for the development of high performance graphene device applications[5].

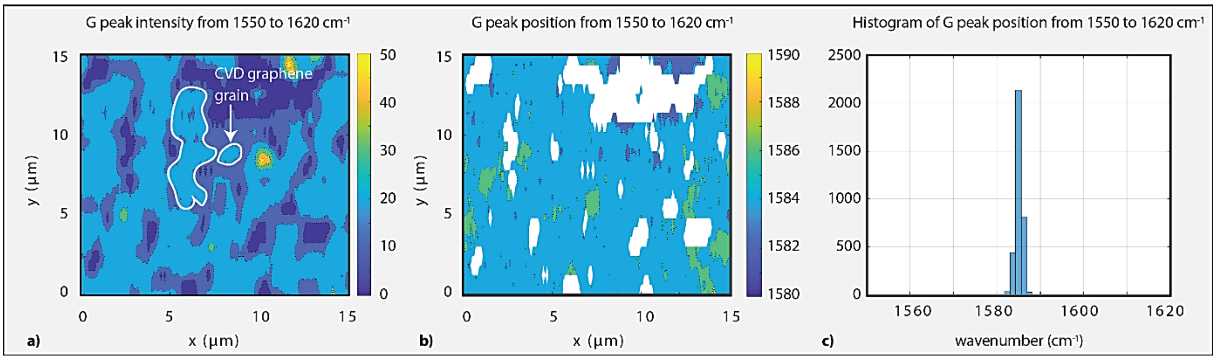

Figure 1. *CVD graphene grain quality characterization using confocal Raman spectroscopy. Inset: white line & arrow indicating the presence of graphene grain.* ***a)*** *Map of the G peak intensity (area: 15x15 μm^2),* ***b)*** *G peak position &* ***c)*** *Histogram of peak position.* ***Note:*** *In figure b, the graphene grain regions are isolated from the substrate (SiO_2/Si) using image processing.*

References

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