Effect of the laser irradiation on the doped graphene grown by microwave surface wave plasma CVD

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With the beginning of the 21st century (2004) graphene has been considered one of the most a promising material which can make a revolution in electronics future application. However, these great achievements have been made in lab-scale. Due to the pristine graphene has high sheet resistance and low work function, so pristine graphene must be modified before it can be a practical replacement for ITO electrodes. Chemical doping of graphene is a key process for the modulation of its electronic properties and the design and fabrication of graphene-based electronic devices. Among the many dopants materials used in doping graphene Gold chloride ($AuCl_3$) which widely used as a p-type dopant in which electrons are extracted from graphene into the adsorbates [1]. It has been demonstrated that the work function of graphene can be tuned by controlling the immersion time of graphene films into $AuCl_3$ solution [2, 3]. A technique of $AuCl_3$ doping has been used effectively to reduce the sheet resistance of graphene and to improve its environmental stability. Here we present an in-situ study of the effect of doping and laser irradiation on morphology, transport properties and optical transmittance of MW-SWP-CVD graphene. The laser irradiation employed to control the doping processing and without loss of their optical transmittance. The expansion of carbon lattice was monitored by Raman spectra (see **Fig (1a)**). Also, the effect of laser on the morphology for doping Graphene using $AuCl_3$ was observed by SEM and AFM. SEM image (see **Fig (1b)**) shows that the sample has a wrinkled surface and consisting of spherical particles shape and the diameter of these particles increased by increasing the power of the laser. Moreover, it's clear from the Hall measurement that the sheet resistance and Hall mobility are reduced, while the carriers' concentrations increased the laser power.

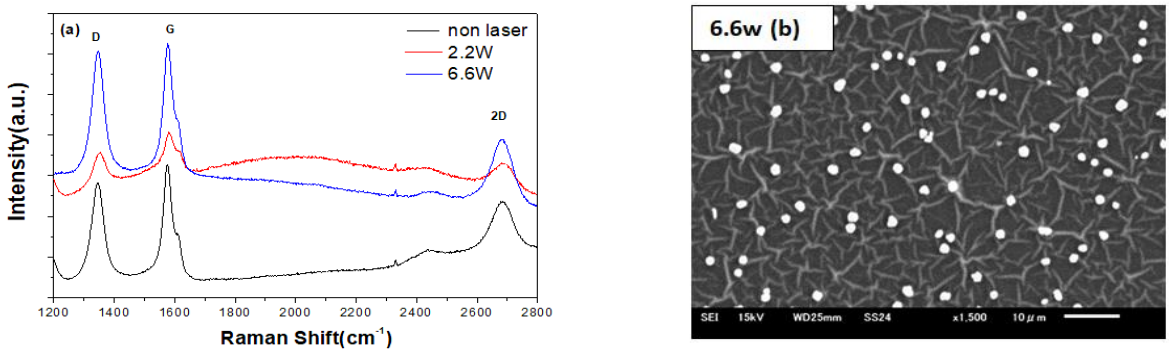

Fig. 1. Influence of Laser Irradiation on (A) Raman spectra and (b) SEM image

References

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