Directly Growing Graphene Film on Quartz by Low Pressure Microwave Plasma Torch Chemical Vapor Deposition

Kun-Ping Huang, Bor-Kae Chang, Chih-Chen Chang

Mechanical and Systems Research Lab., Industrial Technology Research Institute, Bldg. 22, 195, Sec. 4, Chung Hsing Rd., Chutung, 31040, Taiwan, R. O. C.
kphuang@itri.org.tw

Abstract

Traditional methods to prepare graphene film for transparent conducting electrodes involve the wet etching of the metal catalyst and the transfer of the graphene film [1], which can degrade the film through the creation of wrinkles, cracks, or tears. The resulting films may also be obscured by residual metal impurities and polymer contaminants. The electron cyclotron resonance chemical vapor deposition (ECR CVD) method can directly grow nanographene film temperature on SiO_2[2], but its sheet resistance is as high as 20k Ω/□. Here, it is shown that directly growing graphene film on quartz can be achieved by low pressure microwave plasma torch chemical vapor deposition (LPMPT CVD). Raman spectra (Fig. 1) can confirm 2~3 layers graphene film [3], and sheet resistance is 6k Ω/□.

References

[1] Keun Soo Kim, Yue Zhao, Houk Jang, Sang Yoon Lee, Jong Min Kim, Kwang S. Kim, Jong-Hyun Ahn, Philip Kim, Jae-Young Choi, and Byung Hee Hong, Nature Lett., **457** (2009) 706.
[2] Henry Medina, Yung-Chang Lin, Chuanhong Jin, Chun-Chieh Lu, Chao-Hui Yeh, Kun-Ping Huang, Kazu Suenaga, John Robertson, and Po-Wen Chiu, Adv. Funct. Mater., **22** (2012) 2123.
[3] Andrea C. Ferrari, Solid State Commun. **143** (2007) 47.

Figures

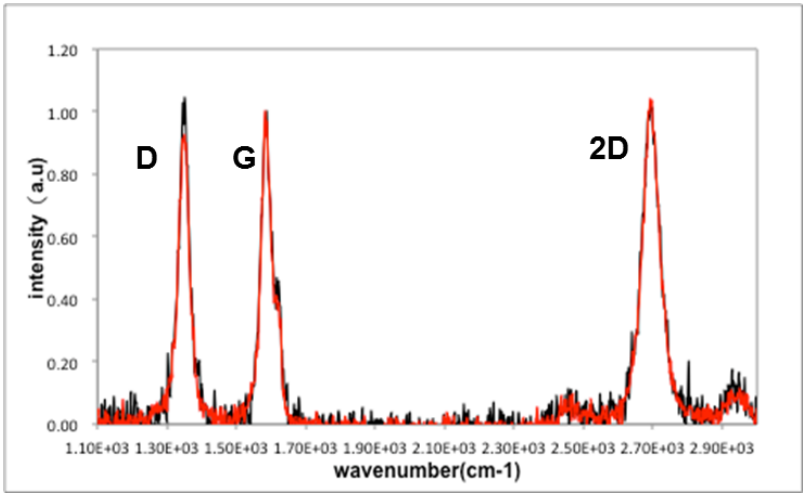

Figure 1. Raman spectra of LPMPT-CVD graphene grown on quartz. The spectra were taken by 532 nm laser excitation.