

Graphene Growth and Chemical Modification of Graphene Surface

이영희

성균관대학교 물리학과, 에너지과학과 (E-mail:leeyoung@skku.edu)

We report that highly crystalline graphene can be obtained from well controlled surface morphology of the metal substrate. Flat copper surface was prepared by using a chemical mechanical polishing method. At early growth stage, the density of graphene nucleation seeds from polished Cu film was much lower and the domain sizes of graphene flakes were larger than those from unpolished Cu film. At later growth stage, these domains were stitched together to form monolayer graphene, where the orientation of each domain crystal was unexpectedly not much different from each other. Bilayer graphene has been also synthesized by a similar approach. Grain boundaries and intentionally formed scratched area of Cu film play an important role for nucleation seeds. Grain orientation of monolayer and bilayer graphene has been extensively studied by confocal Raman mapping. Strong correlation between metal grain size and graphene grain size was also observed. We also propose a simple way of observing graphene grain boundary using optical microscope and correlation to the results from atomic force microscopy and confocal Raman spectroscopy will be also fully discussed in this talk. In addition modification of graphene surface by various methods will be further discussed.

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