The study of making a hexagonal single-crystal graphene island used CVD method on copper foil

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Since its discovery, graphene has attracted a huge attention from researchers for its excellent optical and electrical properties. There is no doubt that the industrialization of graphene will lead to a revolution in optics and electronics. However, obtaining uniform, single crystalline and large area graphene is among required properties for graphene to host integrated devices. Among all methods of obtaining graphene, chemical vapor deposition (CVD) is the most promising method for synthesis of graphene with such properties.

In general, when graphene is synthesized using cvd, a copper foil is usually used. As is well known, the copper foil is poly crystal, so when graphene is continuously synthesized on it, the grain boundaries occur. However, grain boundaries are supposed to debase the electrical and mechanical properties. Thus, efforts have been made to synthesize single-crystal graphene without grain boundaries to address these problems. [1-3] However, these experiments are difficult to implement under normal experimental conditions because special material or methods are used. In this experiment, we tried to overcome these shortcomings by making it easier than the previous experiment, and used CVD method to create a hexagonal single-crystal graphene island, ranging from tens to hundreds of micrometers. We utilize optical microscopy, Raman spectroscopy and SEM images to study the chemical bonding and surface topography status of our synthesized graphene.

References

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[2] Chen, Xiao, et al. "Chemical vapor deposition growth of 5 mm hexagonal single-crystal graphene from ethanol." *Carbon* 94 (**2015**): 810-815.

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Figures

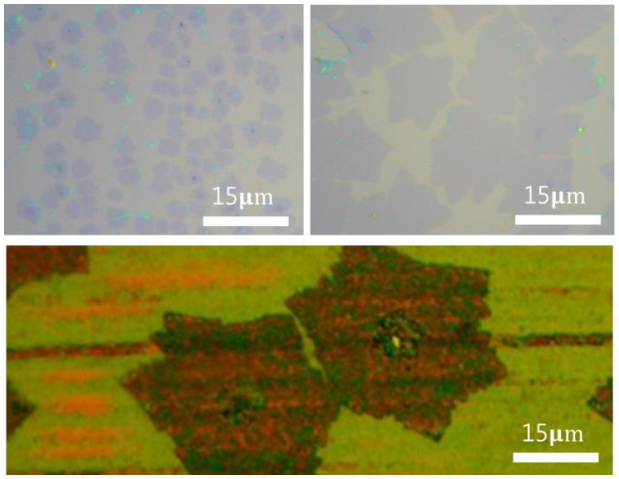

Figure 1. Optical image of a graphene island transferred on SiO_2 substrate and graphene array on oxidised Cu foil. All scale bars are 15**μ**m.