

Improvement of Graphene's Electrical Properties by ICP Cleaning

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Graphene is a carbon based material and it has intriguing features, such as phenomenally strong, thin, flexible, transparent and conductive, those make it attractive for a broad range of applications. Unfortunately, graphene is extremely sensitive to contamination. When we fabricate graphene devices, electrical properties of graphene are altered [1], and the charge carrier mobility drops accordingly by orders of magnitude. This significant impact on electron mobility occurs because any surrounding medium could act as a dominant source of extrinsic scattering, which effectively reduces the mean free path of carriers [2,3]. The dominant contaminant is generated through fabrication stage by polymethyl methacrylate (PMMA) [4], or photo resist (PR). Surface contamination by these residues has long been a critical problem in probing graphene's intrinsic properties. If we clearly solve this problem, we can get highly performed graphene devices. Here, we will report on graphene cleaning process by Induced Coupled Plasma (ICP). We demonstrated how much decomposition of residue impact on improving electrical properties of graphene.

References

- [1] Ni, Z. H. et al., Nano Lett., 10, 3868-3872 (2010).
- [2] Ponomarenko, L. A. et al., Phys. Rev. Lett., 102, 206603 (2009).
- [3] Lafkioti, M. et al., Nano Lett., 10, 1149-1153 (2010).
- [4] Lin, Y. C. et al., Nano Lett., 12, 414-419 (2012).

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