Kaicheng Jia
Hailin Peng*, Zhongfan Liu*
Peking University & Beijing Graphene Institute, Beijing, China
jiakc-cnc@pku.edu.cn

Copper Containing Carbon Feedstock for Growing High Quality Graphene

Abstract
Chemical vapor deposition (CVD) grown graphene holds great potential in controllable regulation and scalable production, especially for methane gaseous carbon source on Cu substrate. However, it's still unclear about the reaction mechanism of cupper and carbon species in the CVD system during high-temperature graphene synthesis. Herein, we choose copper containing carbon feedstock, $Cu(Ac)_2$, instead of common CH_4, to change the content of copper in the system and then study the gas-phase reaction kinetics. Meanwhile, additional Cu cluster will catalyze the decomposition of carbon feedstock and graphitization process, giving high-quality graphene film without defects and amorphous carbon by-product. Transmittance is higher than 97.5% at 550 nm and the average sheet resistances are lower than 300 Ω sq^{-1}, showing improved optical and electrical properties of the graphene grown by $Cu(Ac)_2$. This work not only opens up new thought for growing high-quality graphene film, but also has reference value and significance for the graphene synthesis mechanism.

References

Li, X; Cai, W.; An, J.; Kim, S.; Nah, J.; Yang, D.; Banerjee, S. K. Science, 6 (2011) 1312.
Hao, Y; Bharathi, M. S.; Wang, L; Liu, Y; Chen, H.; Nie, S; Ramanarayan, H. Science, 10 (2013) 1243879.

Figures

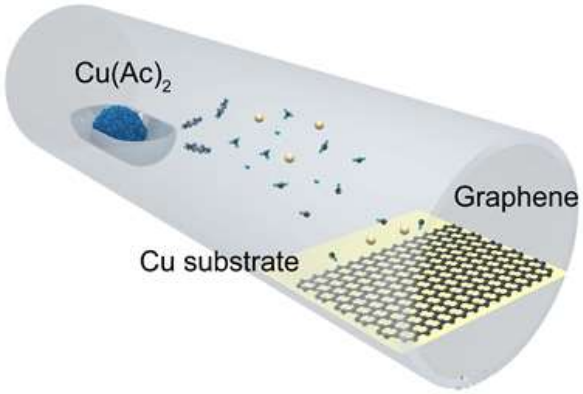

Figure 1: Schematic illustration of the growth of graphene by $Cu(Ac)_2$