Controlled graphene synthesis from solid carbon sources

Kondrashov Ivan, Rybin Maxim and Elena Obraztsova

A.M. Prokhorov General Physics Institute, Vavilov str. 38, Moscow, Russia,119991
navi.soul@gmail.com

Graphene with its extraordinary electronic and mechanical properties can be used in various applications. One of the popular methods of synthesize large area graphene is atmospheric or low pressure CVD technique using hydrogen as a balancing gas and methane or acetylene as primary carbon source gas. But it is difficult to apply the technology to a some of potential applications, because CVD method is limited to the use of gaseous raw materials. Growth from solid carbon sources is not only an alternative route for graphene synthesis as well as a way to avoid the use of dangerous carbon-containing gases and make the synthesis process less expensive.

In this work we present the investigation of controllable growth of large area high quality graphene from different solid carbon sources. We used a CVD configuration from our previous works to grow graphene on Cu foils [1,2], adopting solid hydrocarbon sources. With solid poly(methyl methacrylate) (PMMA) and poly(ethylene) precursors, monolayer graphene films were synthesized at a growth temperature about 850 C and under low pressure conditions. We can control the amount of carbon involved in the synthesis by changing the thickness of the spin-coated PMMA or the amount of poly(ethylene). Raman Spectroscopy has been used for characterization of the layers in graphene films.

Acknowledgement

The reported study was funded by RFBR according to the research project № 18-32-00998.

References

[1] I. I. Kondrashov, P. S. Rusakov, M. G. Rybin, A. S. Pozharov and E. D. Obraztsova, Journal of nanoelectronics and optoelectronics, **8**, 1 (2013) 83-86.
[2] M. G. Rybin, I. I. Kondrashov, A. S. Pozharov, V.C. Nguyen, N.M. Phan and E. D. Obraztsova, Phys. Status Solidi B, **255**,1, (2018)