

## Synthesis of graphene on silver foil by chemical vapour deposition as a tarnish resistant coating

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Synthesis of large-area continuous graphene film by the chemical vapor deposition (CVD) process has been developed and opens up various new possibilities for applications [1]. In the CVD process, catalytic decomposition of hydrocarbons on nickel, copper and cobalt is essential technique for graphene synthesis [2,3]. Similarly, other metals, such as ruthenium, iridium, platinum and palladium have been also investigated as a substrate material for graphene growth. Recently, synthesis of graphene on non-catalytic gold surface has been also demonstrated [4]. The ability to grow graphene in various metal substrates has lot of significance considering opportunities for a wide range of innovative applications.

Here, we report synthesis of graphene on noble metal Ag foil by the CVD process from solid camphor as carbon precursor. Continuous graphene film on Ag foil was grown using the solid camphor as a carbon precursor with a gas mixture of Ar and H<sub>2</sub>. The Raman spectroscopy and transmission electron microscopy studies revealed few layers graphene growth on Ag surface. The graphene coating makes the Ag surface more hydrophobic with a reduction in reflectivity. Tarnishing of the Ag surface in presence of sulfur vapor is investigated with and without coating the graphene film. It is observed that the bare Ag surface immediately reacts with sulfur vapor and turns black, while graphene-coated Ag surface restrains from reacting with sulfur and thereby preserving the Ag surface. Our findings show that graphene film can be successfully synthesized on Ag, which act as effective corrosion and tarnishing barrier of Ag surface. Detailed studies of graphene growth process on Ag foils and effectiveness as a tarnish resistant coating will be discussed in the conference.

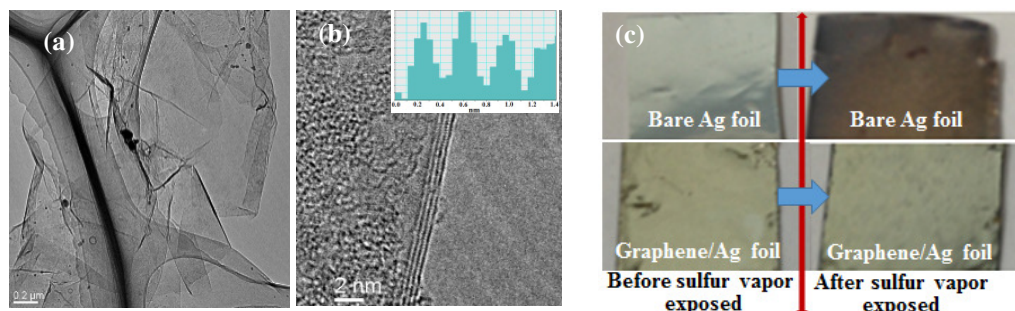


Figure1: Transmission electron microscopy images of (a) graphene sheets and (b) a three layer graphene synthesized on Ag foil. (c) Photographs of bare and graphene-coated Ag foils before and after sulfidation.

### References:

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