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Evolution of chemical vapor deposited graphene domains on Ni and Cu foils using camphor precursor

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Graphene is a two-dimensional (2D) honeycomb of carbon atoms with exciting electrical, mechanical, and chemical properties for electronic device applications [1]. Due to the rapid progress in chemical vapor deposition (CVD) process, synthesis of large-area high quality graphene has become feasible [2].We have previously studied the growth process of graphene from solid camphor on Ni foils and demonstrated the effect of carrier gas on the formation of graphene domains. Enhancement of domain size and quality was found with the addition of small quantity of hydrogen in the gas mixture [3].

Here, we report a comparative study on the graphene growth from camphor by the CVD method for Ni and Cu foils. It was found that optimal growth parameters including temperature, gas mixtures, annealing time, cooling rate and so on were specific for Ni and Cu foils. Although few layers graphene was synthesized on both Ni and Cu substrates, graphene domains on Ni was found to be irregular in size, continuity and number of layers, whereas graphene domains on Cu were found to be much regular. With optimization of experimental condition, hexagonal shaped graphene domains of size around 10 μm were obtained on the Cu foil. With further study of growth process, the continuous growth of hexagons towards millimeter size suitable for device applications will be expected.

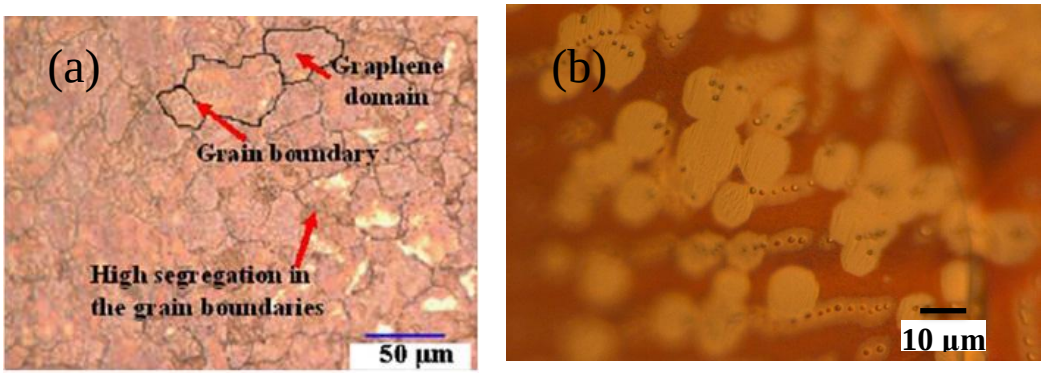

Fig. 1: (a) graphene synthesized on a Ni foil and (b) hexagonal-shaped graphene domains synthesized on a Cu foil.

References:

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