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Controlled CVD growth of graphene and its electronic properties

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Graphene is a perfect two-dimensional atomic crystal. It has attracted considerable attention due to its unusual mechanical, optical and electronic properties. Chemical vapor deposition (CVD) is an effective way to prepare large area and high quality graphene because of its ultra-low cost, high controllability and high scalability. In order to enhance electronic properties of graphene based devices, we fabricated graphene single crystals with a variety of shapes using CVD method. The twelve pointed graphene grains were controllably synthesized. Self-aligned single crystal graphene grains were precisely grown controllably on liquid Cu surface by ambient pressure CVD. Meanwhile, we used an in situ etching method to fabricate large scale graphene arrays with control over the size, shape and location. On the other hand, hierarchical graphene architectures with a layer stacking growth were also fabricated by CVD method. The growth mechanism of graphene and its electrical properties were investigated.

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