

固体前駆体を用いた CVD 法による単層および少数層グラフェン結晶の成長機構

Growth mechanism of monolayer and few-layer graphene crystals in solid precursor based chemical vapor deposition

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We demonstrate a solid carbon source based ambient pressure (AP) chemical vapor deposition (CVD) process to synthesis high quality single crystal graphene. We have used solid camphor, a botanical derivative and waste plastic as carbon source in the CVD process [1-3]. Large hexagonal and round shape crystals can be synthesized on Cu foil by controlling injection of carbon radicals during pyrolysis of the precursor materials. We observed nucleation of bilayer or few-layer graphene crystals with a higher injection rate of decomposed polymeric components. We revealed that the nucleation and growth of a monolayer and few-layer graphene crystals strongly influenced by amount of carbon radicals absorption and surface segregation on Cu surface (Fig.1). Our findings show that controlling the growth conditions synthesis of large graphene crystal with a distinctive shape and controlled layer number can be achieved in the solid precursor based CVD process.

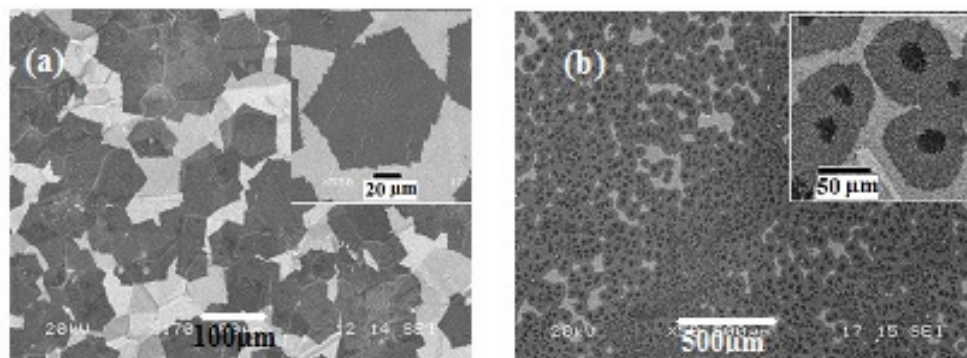


Fig. 1 Nucleation and growth of (a) monolayer and (b) stacked few-layer graphene crystals in a solid carbon source based CVD method.

Reference

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