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**Fabrication of graphene-based films using remote plasma CVD**

MINEO HIRAMATSU, RYOSUKE TSUKADA, YOHEI KASHIMA, MASATERU NAITO, Meijo University, HIROKI KONDO, MASARU HORI, Nagoya University — Plasma-enhanced CVD (PECVD) employing methane/hydrogen gases has been used to grow diamond, diamond-like carbon, and carbon nanotubes. In the case of microwave PECVD with methane/hydrogen system without catalyst nanoparticles at temperatures of 700–850 °C, where the substrate is exposed to the plasma, vertical nano-graphenes and carbon nanoflakes have been easily grown even on Cu substrate due to the ion bombardment and local electric field forces. In this work, we demonstrate the synthesis of planar few-layer graphene-based film using PECVD with remote plasma configuration. In the case using microwave plasma of cylindrical resonant cavity type, by simply installing grounded grid over the substrate plate for obtaining remote plasma configuration, we have successfully fabricated graphene-based films on Cu substrate, which was confirmed by the Raman spectrum and SEM image of deposit. Similar method will be applied to other plasmas such as low-pressure inductively coupled plasma, in order to verify the effectiveness of remote plasma configuration for the growth of planar graphene using PECVD technique. We will discuss the planar graphene growth mechanism in terms of precursors and their surface reaction.

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