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Graphene Synthesized by Plasma Enhanced Chemical Vapor Deposition at Low-Temperature

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Synthesis graphene on Cu substrate by plasma-enhanced chemical vapor deposition (PE-CVD) is investigated and its quality's affection factors are discussed in this work. Compared with the graphene synthesized at high temperature in chemical vapor deposition (CVD), the low-temperature graphene film by PE-CVD has relatively low quality with many defects. However, the advantage of low-temperature is also obvious that low melting point materials will be available to synthesize graphene as substrate. In this study, the temperature will be kept constant in 400°C and the graphene was grown in plasma environment with changing the plasma power, the flow rate of precursors, and the distance between plasma generator coil and substrates. Then, we investigate the effect of temperature and the influence of process variables to graphene film's quality and characterize the film properties with Raman spectroscopy and sheet resistance and optical emission spectroscopy.

Keywords: graphene, PECVD, low-temperature process