

Comparing Characteristics of Graphene Films Grown by Surface Wave Assisted Microwave Plasma CVD using Camphor and Methane Precursors.

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In this work, we employed surface wave assisted micro wave plasma (MW SWP) CVD to grow graphene films on commercial copper substrate at comparatively low temperature (550°C). Graphene films were grown under identical experimental conditions by using camphor and methane precursors. Fig. 1 shows Raman spectra of as grown graphene on Cu foils. Disappearance of peaks around 2900 and 3200 wavenumbers clearly reflect the quality improvement of graphene film grown by camphor precursor than methane. This phenomenon may be understood as the better graphitization of graphene film while using camphor than methane.

Graphene films were transferred on quartz substrates and their respective sheet resistances and transmissions were measured. Sheet resistance of undoped graphene films were achieved up to 1.7 k Ω /sq with 93.58% transmission at 550nm by using camphor, while the values were higher (5.6 k Ω /sq, 85.51% transmission at 550nm) in the case of methane. In order to observe the well graphitization temperature of methane, a typical graphene growth experiment was performed at 800 °C. Raman signal in Fig. 2 reveals a very good quality graphene. This film shows 3 k Ω /sq sheet resistance and 89.90 % transmission at 550nm.

In conclusion, well graphitization occurred while using camphor precursor than methane which affects to sheet resistances and transmissions values.

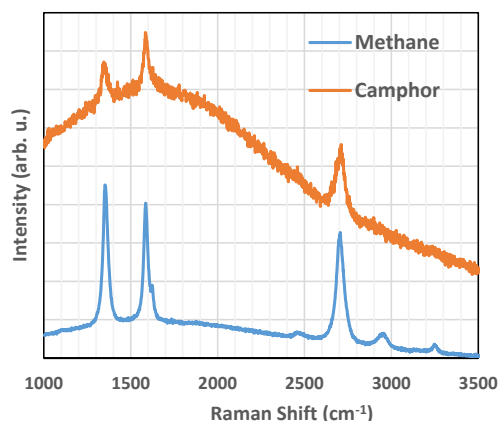


Fig. 1 Raman spectra of as grown graphene on Cu at 550 °C

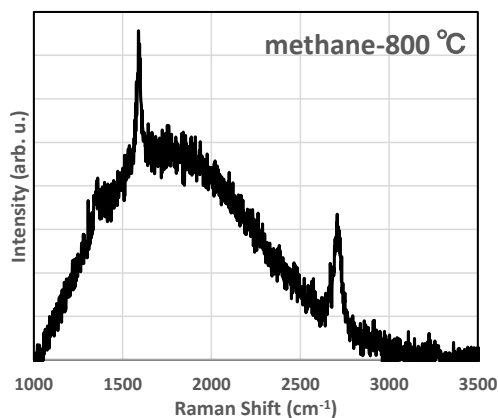


Fig. 2 Raman spectra of as grown graphene on Cu at 880 °C

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