

Synthesis and characterization of single-layer graphene by chemical vapor deposition using N-octane as precursor

André do Nascimento Barbosa

Fernando Lázaro Freire Júnior

Eric Cardona Romani

Cesar Augusto Díaz Mendoza

Pontifícia Universidade Católica do Rio de Janeiro, Rua Marquês de São Vicente, 225, Gávea, Rio de Janeiro, Brazil

andrenbarbosa@vdg.fis.puc-rio.br

We report single-layer graphene synthesis using high-carbon count N-Octane as precursor. Unlike methanol, ethanol and other liquid carbon precursors, N-Octane is oxygen free and as its molecular structure is simply a common hydrocarbon, C-C bonds break of at lower temperatures need for C-H Bonds found in methane, providing more Carbon for synthesis and then lower synthesis time. Optimal Precursor pressure for synthesis is found to be at 15-50 *mTorr* range, as lower pressures we have had incomplete cover of substrates. We could lower the synthesis temperature from the usual ~1000 °C Range down to ~800 °C, this was possible due to N-Octane lower activation temperature. Finally, we report a lower synthesis time, as we only needed 10 minutes for the complete cover of the substrates. Characterization of graphene layers were made by using Raman Scattering spectroscopy, scanning electron microscopy, atomic-force microscopy as well as Scanning tunnelling microscopy.

References

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- [2] MATTEVI, Cecilia; KIM, Hokwon; CHHOWALLA, **Journal of Materials Chemistry**, v. 21, n. 10 (2011) p.3324-3334.
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Figures

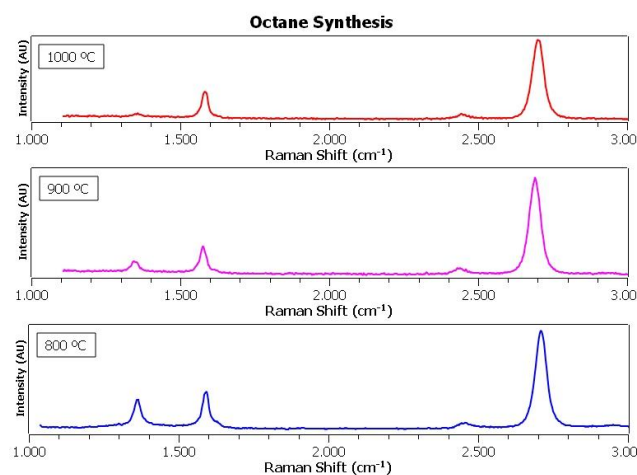


Figure 1: Raman Spectra of 1000°C, 900 °C and 800 °C samples comparison. The samples were transferred to SiO₂ silicon wafer substrate.

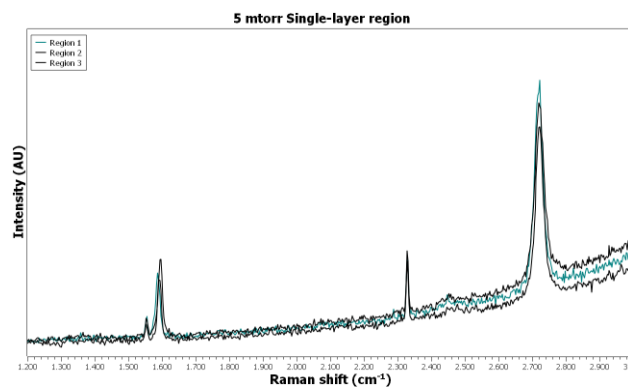


Figure 2: preliminary Raman Spectra of three random points over copper substrate. The sample was obtained using only a precursor pressure contribution of only 5 *mtorr*.