

Title:

Polymer-Free Transfer Of Graphene-Based Material Derived From Cooking Palm Oil By Chemical Vapour Deposition Technique

Journal:

Malaysian Journal of Analytical Sciences, Volume 26, Issue 5

Document Type: Article**Authors:**

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Publisher : Malaysian Society of Analytical Sciences

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Abstract:

Chemical vapour deposition (CVD) of cooking palm oil precursors with a nickel (Ni) catalyst is an established method to produce graphene-based materials. Nonetheless, transferring the graphene sheets from the substrate surface to a selected target substrate presents a major challenge. The utilisation of well-known poly (methyl methacrylate) (PMMA)-assisted graphene transfer promotes defects, impurities, folds, and wrinkles in the graphene sheets, thus affecting its properties. Consequently, the present study demonstrated a polymer-free graphene sheets transfer technique on a Ni substrate derived from cooking palm oil. A dropwise hexane layer substituted the PMMA supporting layer during the etching process to remove the Ni substrate. The quality of the graphene sheet was investigated with optical microscopy by employing a Leica DM1750 M microscope, scanning electron microscopy (SEM) with a Hitachi S-3400N, and Raman spectroscopy utilising a UniDRON automated microscope Raman mapping system with 514 nm laser excitation. Resultantly, macroscopically clean and crack-free graphene sheets were obtained. Furthermore, the technique was less complicated than the PMMA-assisted transfer technique. The Raman spectra of the polymer-free method also revealed visible graphene peaks, which was absent in the PMMA-transferred samples.