



Microscopic Images of Graphene Layers of Different Thicknesses

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Optical imaging of mono/multi-layered graphene sheets was performed using three different microscopic techniques: wide-field microscopy (WFM), phase contrast microscopy (PCM), and differential interference contrast microscopy (DICM). These microscopy techniques were implemented with transmitted back-lighting, and the graphene samples were placed in a thin water layer between two microscopic cover-slips. Due to the highly transparent nature of the graphene, which has *thickness* = 0.335 nm per layer, the mono/bi-layer graphene images came with low contrast. For the case of the thick graphene layers (8-10 layers), their boundary lines were more clearly distinguishable, as elicited by the PCM imaging technique. The DICM imaging was more useful in delineating the topography of the multi-layered (5 layers) graphene. Mono/bi-graphene layers can be synthesized by a chemical reaction deposition, whereas thicker graphen layers can be mechanically exfoliated by ultrasonic hammering.

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