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Thermal Chemical Vapor Deposition of Graphene Layers

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Graphene is a two-dimensional sp^2 layer material. Despite the short history in the empirical synthesis of the graphene layers, the academic/industrial unique features have brought highly significant interest in research and development related to graphene-related materials. In particular, the electrical and optical performances have been targeted towards pre-existing microelectronic and emerging nanoelectronic applications. The graphene synthesis relies on a variety of processing factors, such as temperature, pressure, and gas ratios involving H_2 , CH_4 , and Ar, in addition to the inherent selection of copper substrates. The current work places its emphasis on the role of experimental factors in growing graphene thin films. The thermally-grown graphene layers are characterized using physical/chemical analyses, i.e., four point resistance measurements, Raman spectroscopy, and UV-Visible spectrophotometry. Ultimately, an optimization strategy is proposed in growing high-quality graphene layers well-controlled through empirical factors.

Keywords: Graphene, Thermal, CVD, Chemical vapor deposition