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Deposition and Characterization of Graphene Materials Deposited through Thermal Chemical Vapor Deposition

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Graphene-based materials have been gaining the unprecedented academic and industrial applications, due to the unique charge transport as a new kind of 2-dimensional materials. The applications incorporate electronic devices, nonvolatile memories, batteries, chemical sensors, etc. based on the electrical, mechanical, structural, optical, and chemical features newly reported. The current work employs thermal chemical vapor deposition involving H₂ and CH₄, in order to synthesize the 2-dimensional graphene materials. The qualitative/quantitative characterizations of the synthesized graphene materials are evaluated using Raman spectroscopy and Hall Measurements, In particular, the effect of processing variables is systematically investigated on the formation of graphene materials through statistical design of experiments. The optimized graphene materials will be attempted towards the potential applications to flat-panel displays.

Keywords: graphene, Raman spectroscopy, Hall measurement, CVD