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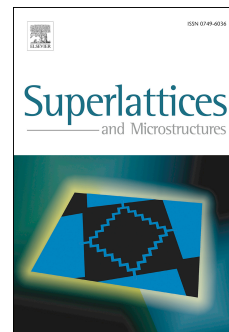
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Fabrication of graphene from graphite by a thermal assisted vacuum arc discharge system

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In this study, graphene was fabricated on copper foils using a high temperature furnace embedded in a vacuum arc discharge method. Combining the advantages of chemical vapor deposition and vacuum arc discharge, single-layer graphene can be fabricated at 600 °C base temperature from the mini furnace embedded with a fast heating via the photon radiation from the vacuum arc to 1100 °C on the substrates' surface. The optimal fabrication condition was determined through a series of experiments on ambient pressure, processing time, arc currents, and the cooling process. Observations by scanning electron microscopy, Raman spectroscopy, and optical microscopy showed that the main products were single-layer graphene, which has a uniform thickness across the entire substrate. The results demonstrated that the combination of a vacuum arc with a thermal method that uses graphite as a carbon source provides a low-cost and straight forward method to synthesize graphene films for graphene-based applications.

Keywords: Vacuum arc discharge, Graphene, Raman spectroscopy

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