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Plasma Processing for Graphene-Based Materials MINEO HIRAMATSU, KEIGO TAKEDA, Meijo University, HIROKI KONDO, MASARU HORI, Nagoya University — Graphene-based materials such as carbon nanotube and graphene itself have attracted much attention due to their emerging applications. Graphene-based materials can be synthesized by several plasma enhanced chemical vapor deposition (PECVD) techniques on heated substrates employing CH4 and H2 mixtures. For example, plane graphene can be formed by PECVD on Ni in the remote plasma configuration at relatively low temperatures. Excess flux of carbon precursors causes supersaturation and ion bombardment induces the nucleation of nanographene, resulting in the formation of vertical nanographene (carbon nanowall, CNW). CNWs are few-layer graphenes standing on a substrate to form a self-supported network of wall structures. The maze-like architecture of CNWs with large-surface-area would be useful as electrodes for energy devices, electrochemical and biosensors. Morphology and electrical property of carbon nanostructures should be controlled according to their applications. Plasma processing has a significant role in fabricating carbon-based materials and achieving their practical use in many areas. We report the current status of the synthesis of graphene-based materials using several PECVD techniques, and focus on the structure control during growth processes as well as post treatment such as etching and surface termination.

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