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Effects of Flux and Energy of Neutral Beam on Hydrogenation of Graphene TAKERU OKADA, Institute of Fluid Science, Tohoku University, SEIJI SAMUKAWA, WPI-AIMR, Tohoku University — Hydrogen modification, hydrogenation, of graphene, has attracted due to the possibility of hydrogen storage. Chemisorbed hydrogen has strong interaction with graphene surface and sp3 bond forms. Surprisingly, ideal structure of graphene shows reversible absorption of hydrogen and it leads to effective designing of hydrogen storage material. In this paper, we have demonstrated neutral beam (NB) technique for hydrogenation of graphene instead of conventional plasma method. NB system consists of a plasma generation chamber and a process chamber, which are separated by a carbon plate with many apertures. The charged particles can be effectively neutralized by collision with the sidewall of the apertures when passing through them to the process chamber. Development of the D-band and blue shift of G-band were observed after hydrogen NB irradiation by Raman spectroscopy. FTIR analysis reveals CH bending mode was appeared and it depends on beam energy, thus CH formation has reaction threshold and potential to control it. In addition, it is shown that beam flux affects hydrogenation and additional effect is also included in reaction process. We believe our investigation will provide development of hydrogenated graphene applications.

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