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Removal of DLC film on polymeric materials by low temperature atmospheric-pressure plasma jet DAICHI KOBAYASHI, FUMIYUKI TANAKA, YOSHIYUKI KASAI, JUNKI SAHARA, TOMOHIKO ASAI, Nihon University, MASANORI HIRATSUKA, Nanotec Corp., MIKIO TAKATSU, Heiwa Electric Co.,Ltd, HARUHISA KOGUCHI, National Institute of Advanced Industrial Science and Technology — Diamond-like carbon (DLC) thin film has various excellent functions. For example, high hardness, abrasion resistance, biocompatibility, etc. Because of these functionalities, DLC has been applied in various fields. Removal method of DLC has also been developed for purpose of microfabrication, recycling the substrate and so on. Oxygen plasma etching and shot-blast are most common method to remove DLC. However, the residual carbon, high cost, and damage onto the substrate are problems to be solved for further application. In order to solve these problems, removal method using low temperature atmospheric pressure plasma jet has been developed in this work. The removal effect of this method has been demonstrated for DLC on the SUS304 substrate. The principle of this method is considered that oxygen radical generated by plasma oxidize carbon constituting the DLC film and then the film is removed. In this study, in order to widen application range of this method and to understand the mechanism of film removal, plasma irradiation experiment has been attempted on DLC on the substrate with low heat resistance. The DLC was removed successfully without any significant thermal damage on the surface of polymeric material.

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