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High Power Pulsed Magnetron Sputtering for Deposition of Amorphous Carbon Films[1] TAKASHI KIMURA, RYOTARO NISHIMURA, Nagoya Institute of Technology — High power pulsed magnetron sputtering technology has been recently attracted, because target species sputtered by energetic ion bombardment are highly ionized and the energy of the ions is high enough to modify the substrate surface. In this study, the relationship between the properties of deposited films and the operating conditions of the high power pulsed plasmas has been experimentally investigated. The distance between the carbon target (80mm in diameter) and the substrate is 55mm, and the strength of magnetic field is approximately 0.04T in the vicinity of the target surface. In our experiment, the dissipated power and the repetition frequency are fixed at 50W and 50Hz, respectively. On the other hand, the maximum of instantaneous power is varied from 5kW to 30 kW by changing the duty ratio, and the magnitude of the current is also varied up to 40A. The typical deposition rate is around 5nm per minute and the typical film thickness is around 0.6μm. The films can be regarded as diamond-like carbon (DLC) films. The maximum of the hardness increases with the magnitude of the pulsed current and reaches 18GPa at 35A.

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