

## **Characteristics of Silicon-incorporated diamond-like carbon films by RF chemical vapor deposition multilayer films**

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Silicon incorporated Diamond-like carbon (Si-DLC) films have been attracting a interesting of researcher since they have a great potential for solving some of the disadvantages of pure DLC films. Particularly, Silicon addition improved a adhesion of DLC films. In this study, Silicon incorporated Diamond-like carbon (Si-DLC) films were deposited on a high speed steel test samples by a radio frequency plasma-enhanced chemical vapor deposition method. We used hexamethyldisilane (HMDS) gas as a Silicon source with an carrier gas and varied a carrier gas of Ar in ranging from 0 to 15 sccm. Also, mixtures of methane (CH<sub>4</sub>) and Ar gases was used as a precursor gases. The adhesion property of Si-DLC films was evaluated by the scratch test. We discussed the properties of Si-DLC films using Raman spectrometer and atomic force spectroscopy (AFM). It was found that the adhesion of Si-DLC films with Si content ranging from 5 to 10 sccm was significantly improved and the critical load was increased from 30 N without Si content to 60 N, however the adhesion of them with Si content of 15 sccm was decreased.