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## Carbon and SiOCH films synthesized by atmospheric pressure method

There are many reports on diamond-like carbon (DLC) films by the atmospheric pressure chemical vapor deposition (AP-CVD) in order to improve their hardness, but it did not succeed because the dense plasma reacts each other in the space and forms particles before arriving onto the substrates. In 2014, our group succeeded in synthesizing hard a-C:H films by the filamentary dielectric barrier discharge (FDBD). In the filament-shaped plasma, the ion density is much larger than that of glow discharge, results in forming larger sp3 bonding. In this study, the discharge type was transited from glow DBD (GDBD) to FDBD by increasing the gap between the electrodes from 1mm to 4mm. The hydrogen concentration of the a-C:H films synthesized by FDBD was reduced compared to that of the films synthesized by GDBD. The hardness of the films increased from 4GPa to 12GPa. These results show that the hard a-C:H films can be synthesized even at low temperature by FDBD. In this study, we also set up a remote-type plasma enhanced CVD apparatus and synthesized SiOCH films under atmospheric pressure. The hardness of the SiOCH increased from 0.5GPa to 2.5GPa as the oxygen flow rate increased from 0ml/min to 750ml/min. The remote-type methods on SiOCH films are suitable for coating on curve surface such as car windows of polycarbonate.

### Biography

Tetsuya Suzuki works as a Professor in Center for Environment and Energy, Keio University. In 1985: Graduated from Inorganic Materials department of Tokyo Institute of Technology, 1990: PhD from Department of Nuclear Engineering, Tokyo Institute of Technology, 2005: Professor, Center for Environment and Energy, Keio University, 2013-2018: Director of Keio Leading-Edge Laboratory.

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