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### **Synthesis of diamond-like carbon thin films using helicon wave plasma CVD**

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Properties of high-density Ar/CH<sub>4</sub> plasmas with excitation of the m=1 mode helicon wave has been studied for reactive plasma synthesis of diamond like carbon (DLC) thin films. DLC was deposited on Si substrates by helicon wave plasma reactor. The reactive species of the helicon plasma in the reaction chamber were measured by the optical emission spectra (OES). OES show that the line emissions of CH and C<sub>2</sub> were considerably enhanced in the helicon wave-excited high-density plasma. Plasma density and electron temperature was measured by Langmuir probe. The deposited DLC thin films were characterized by scanning electron microscopy (SEM) and Raman spectroscopy. It is found that an increase of the growth rate with the external magnetic field increase (from 1200G to 2400G). The I(D)/I(G) ratio and the G peak position decreased as a function of magnetic field, where the full width at half maximum (FWHM) of G peak increased. This indicates that the sp<sup>3</sup> content increase.