# OPTICAL AND MECHANICAL PROPERTIES OF NITROGEN-DOPED DIAMOND-LIKE CARBON FILMS

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S u m m a r y

The optical and mechanical properties of diamond-like carbon films (DLCFs) deposited using the plasma-enhanced chemical vapor deposition technique from $CH_4$—$H_2$—$N_2$ gas mixtures with various nitrogen contents have been investigated at various radio-frequency (RF) discharge powers and gas pressures in a plasma reactor. Ellipsometry, as well as transmission and reflectance spectroscopies, was used to study the optical properties of the films. Their mechanical properties — in particular, wear resistance — were analyzed making use of the nanoindentation technique. The film thickness was also measured with a profilometer and compared with the results of ellipsometric studies. It has been demonstrated that the growth of the nitrogen content in a gas mixture and the reduction of the discharge power are accompanied by an increase of the optical bandgap and, consequently, of the carbon film transmittance, with the hardness and the refractive index of the film becoming lower at that. The rate of the film deposition considerably increases as the discharge power grows, whereas the nitrogen concentration in the gas mixture weakly influences the former.