

## [IV~6]

### Ion Shower Doping Effect in Diamond-Like Carbon Films

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Recently, the application of flat panel display(FPD) in multi-media portable electronics has spurred in developing low cost and high performance display. Among FPD, FED(Field Emission Display) has many desirable aspects similar to Cathode Ray Tube. This display uses a very fine micro-tip made of c-Si, Mo, with a work function  $\sim 4$  eV for electron source. But it has severe technical difficulties such as high vacuum, high voltage for the emission process, aging of tips from color phosphor and oxidation of tips. Doped DLC films do not require sub-micro tips and high driving voltage due to its low work function. It will show very low work function with a few tenths of eV if it is properly doped. The effects of ion doping on the structural and electrical properties of DLC films have been investigated as functions of ion dose, ion acceleration voltage using ion doping system. The DLC films have the optical band gap of 1.2 eV, hydrogen content of  $\sim 18$  at. %, R.T. conductivity  $\sim 10^{-10}$  S/cm. At high dose( $10^{16}$  cm $^{-2}$ ), the implanted layer seems to be graphitized and is highly conductive. Graphitization means a transformation into three-fold coordinated ( $sp^2$ ) and resistivity drops abruptly from  $10^{10}$   $\Omega$  cm to  $10 \sim 10^{-1}$   $\Omega$  cm. The possibility of substitution doping in DLC films by ion shower technique will be discussed on the basis of experimental results.