

## CN계 나노구조의 구조적·광학적 특성

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Nanostructures of CN-based material were fabricated by surface treatments and plasma enhanced chemical vapor deposition (PECVD). Amorphous  $CN_x$  thin films grown on Si (100) wafer by PECVD at room temperature were first treated by  $H_2$  plasma and then annealed at 200–300°C. Moreover, SiCN nanometric powder was synthesized at room temperature and 300°C in rf discharges of  $SiH_4$ -Ar- $CH_4$ - $N_2$  gas mixture. The effects of surface treatments on structural and optical properties of the CN-based nanostructures were investigated by PL, FT-IR, EDS, AES, AFM, and XRD. Well-defined nanodots and nanostripes were formed depending on temperature and plasma-treatment time. The PL spectra showed that the band-gap energy of the films is between 1.9 and 2.1eV. The FT-IR spectra showed the presence of Si-N peak at  $430\text{ cm}^{-1}$ , Si-C peak at  $910\text{--}1010\text{ cm}^{-1}$ , C-N peak at  $1260\text{ cm}^{-1}$ , C=N peak at  $1640\text{--}1670\text{ cm}^{-1}$ , respectively. The EDS and AES analysis showed that the  $CN_x$  consists of 90 at. % C and 9 at. % N, and SiCN has 82 wt. % Si, 9wt. % C, 6 wt. % N, and 2 wt.% O.