

Effect of deposition temperature on chemical and optical properties of amorphous carbon nitride films

김상훈, 라현욱, 한윤봉*

전북대학교

(ybhahn@chonbuk.ac.kr*)

The amorphous carbon nitride(a-CN) films which were excellent mechanical properties would be similar to the crystalline diamond, or more. The a-CN films were grown on Si(100) by plasma enhanced chemical vapor deposition using methane(CH₄)-nitrogen(N₂) mixture. A systematic study was done to check the effect of deposition temperature on chemical and optical properties of the a-CN films. Due to upward thermal convection from the substrate surface at a higher temperature, the thickness of a-CN films was decreased with increasing the deposition temperature which was confirmed by FESEM. In FT-IR analysis, various absorption bands were observed. The presence of C-N (1100 cm⁻¹), C=N (1600~1700 cm⁻¹), C-H (2700~2900 cm⁻¹), and N-H (3200~3500 cm⁻¹) bonds were shown in all the cases. Especially, the C≡N (2100~2200 cm⁻¹) bond was obtained in the samples grown at 100 °C. To check the reflectivity of the a-CN films, the electrophotometer was used. The main peak of photoluminescence (PL) was shown at 2.0 ~ 3.7 eV. It seems to contain three emission peaks at approximately 2.1, 2.2 and 2.4 eV, respectively.