

## Effect of rf power on the roughness and bond structures of carbon nitride films grown by plasma enhanced chemical vapor deposition

김상훈, Umar Ahmad, 박용규, 김진환, 이은원, 한윤봉\*  
전북대학교  
(ybhahn@chonbuk.ac.kr\*)

Amorphous carbon nitride films were deposited on Si(100) substrates at room temperature by plasma enhanced chemical vapor deposition (PECVD) using the gas mixtures of CH<sub>4</sub> and N<sub>2</sub> as source gases. In this work, the effect of the rf power on growth rate, bond structure, surface roughness and mechanical properties of the films were characterized. It was observed that the films growth rate decreased from 3.5 to 2.2 nm/min with increasing the rf power from 500 to 800W. The OES data exhibited that an increase in rf power result in the increase of energetic C and N species. Simultaneously, there are sputtering reactions at higher rf powers on the film surfaces caused by nitrogen ion bombardment. Bigger cluster size was obtained on the film surfaces at a higher rf power, which was confirmed by AFM. Various bond structures such as C-N (~ 1100 cm<sup>-1</sup>), C=N (~ 1600 cm<sup>-1</sup>), and C≡N (~ 2200 cm<sup>-1</sup>) have been observed by FT-IR spectra. The Raman-scattering spectra showed D band at 1380 cm<sup>-1</sup> and G band at 1580 cm<sup>-1</sup>, respectively.