

Bias effect on the chemical structure and hardness during deposition of carbon nitride film by RF magnetron sputtering

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CN_x films fabricated by different deposition techniques to synthesize of β -C₃N₄ involve two problems; nitrogen deficiency and sp² hybridized bonding. Nitrogen contents in most of the thin films are lower than stoichiometric composition 57% and all carbon of the predicted β -C₃N₄ phase has to be sp³ hybridized, however, incorporation of N in sp³-rich C strongly promotes a transformation of the C to sp². It is known that these structural change influence the change of the mechanical and other properties.

We investigate the effect of the bias to the substrate on the CN_x film properties during the deposition by the RF magnetron sputtering. Carbon nitride films were deposited on Si(100) substrates by RF magnetron sputtering at different working pressure. The influence of bias power on the chemical structure of the carbon nitride films has been discussed.

We expect the ion energies will be changed by the bias power and this would change the film hardness and chemical structure of the CN_x films