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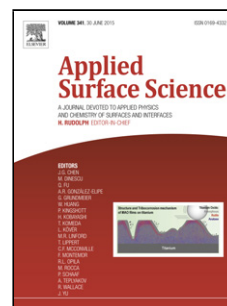
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Optical and XPS studies of BCN thin films by co-sputtering of B₄C and BN targets

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Highlights

- A wide range of optical band gaps (E_g) are achieved for dual target sputtered deposited BCN thin films in the range of 1.9 eV to 3.7 eV.
- Optical band gap (E_g) studies are performed as a function of target powers, gas ratios and deposition temperatures.
- E_g is found to increase with N₂/Ar flow ratios and deposition temperatures.
- XPS studies are conducted to ascertain the chemical and bonding characteristics.
- XPS confirmed higher h-BN and B₄C characteristics with increase in N₂/Ar gas ratios for films deposited at 20W and 40W B₄C power respectively.

ABSTRACT

Boron carbon nitride (BCN) thin films are investigated for their optical properties. BCN, is the unanimous choice for inter-dielectric layer (IDL) in very large scale integration (VLSI) because of its low-k dielectric constant. Optical properties can be tailored as a function of elemental composition, which makes BCN a prospective material in UV-filters and mirrors. Films are deposited by reactive co-sputtering of boroncarbide (B₄C) and boronnitride (BN) with varying N₂/Ar gas flow ratio by DC and RF sputtering respectively. XPS studies are performed to deduce the bonding and chemical properties of the BCN film. Optical band gap (E_g) studies are

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