

Abstract Submitted  
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**Effect of Low-Energy Ions on Plasma-Enhanced Deposition of Cubic Boron Nitride**<sup>1</sup> M. TORIGOE, S. FUKUI, K. TEII, S. MATSUMOTO, Kyushu University — The effect of low-energy ions on deposition of cubic boron nitride (cBN) films in an inductively coupled plasma with the chemistry of fluorine is studied in terms of ion energy, ion flux, and ion to boron flux ratio onto the substrate [1]. The ion energy and the ion to boron flux ratio are determined from the sheath potential and the ratio of incident ion flux to net deposited boron flux, respectively. For negative substrate biases where sp<sup>2</sup>-bonded BN phase only or no deposit is formed, both the ion energy and the ion to boron flux ratio are high. For positive substrate biases where cBN phase is formed, the ion energy and the ion to boron flux ratio are estimated in the range of a few eV to 35 eV and 100 to 130, respectively. The impact of negative ions is presumed to be negligible due to their low kinetic energy relative to the sheath potential over the substrate surface. The impact of positive ions with high ion to boron flux ratios is primarily responsible for reduction of the ion energy for cBN film deposition.

[1] K. Teii and S. Matsumoto, *Thin Solid Films* **576**, 50-54 (2015).

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