

Abstract Submitted  
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**Synthesis of boron nitride using a micro hollow cathode discharge deposition reactor.** CLAUDIA LAZZARONI, SALIMA KASRI, HIBA KABBARA, GUILLAUME LOMBARDI, VIANNEY MILLE, ALEXANDRE TALLAIRE, LSPM CNRS UPR 3407 UNIV. PARIS 13 SORBONNE PARIS CITE, KRISTAQ GAZELI, JOAO SANTOS SOUSA, LPGP CNRS Univ. Paris-Sud Univ. Paris-Saclay — A Micro Hollow Cathode Discharge reactor in Ar/N<sub>2</sub> gas mixtures is used to deposit hexagonal boron nitride (h-BN), a strategic material which is highly demanded for electronic and optoelectronic applications. The deposition reactor is composed of two chambers and the micro-plasmas, arranged into an array, are located at the junction between them. The plasma source consists of an anode-dielectric-cathode sandwich through which one or several holes of 400 μm in diameter are drilled. The higher pressure chamber (several tens of mbar), favors the production of high density plasma, and consequently high nitrogen dissociation, while the lower pressure chamber (several mbar) limits the nitrogen recombination. The polarizable and heating substrate holder is located in the lower pressure chamber where the boron precursor (BBr<sub>3</sub>) is injected. The polarization of the substrate holder allows the discharge to be expanded from the holes to the substrate. The Ar/N<sub>2</sub> plasma properties are characterized by optical emission spectroscopy to help the process optimization. The deposited films show a clear signature of h-BN on Raman spectra but the crystalline and surface quality still needs to be improved. The influence of the operating conditions (substrate nature and temperature, gas mixture,..) on the deposited film properties will be presented.

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