



Namur Institute of Structured Matter



UNIVERSITÉ
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NISM Seminar

Rajesh GANESAN

The University of Sydney, NSW 2006 Australia

« Highly tetrahedral amorphous carbon films by HiPIMS »

When and where:

Monday July 6th 2020 at 11:00
UNamur, Rue Grafé 2, B-5000 Namur
CH01

« Highly tetrahedral amorphous carbon films by HiPIMS »

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High-power impulse magnetron sputtering (HiPIMS) is used to deposit amorphous carbon (a-C) thin films with sp³ fractions higher than 70%. Increasing the pulse length results in a transition from conventional HiPIMS deposition to a “mixed-mode” in which an arc triggers on the target surface, resulting in excessive generation of carbon ions. In mixed mode HiPIMS operation, short-lived cathode spots form in the magnetic racetrack and produce large numbers of carbon ions. The chemical and physical properties of the deposited a-C films vary in a consistent manner, showing a high tetrahedral character only for long pulses, demonstrating that mixed-mode deposition is the source of the high carbon ion flux. Varying the substrate bias reveals an “energy window” effect, where the sp³ fraction of the films is greatest for a substrate bias around –100V and decreases for higher or lower bias values. In the absence of bias, the films' properties show little dependence on the pulse length, showing that energetic ions are the origin of the highly tetrahedral character.