Graphene and Boron-doped Graphene by Pulsed Laser Deposition

C. DONNET
Y. BLEU, F. BOURQUARD, A.-S. LOIR, S. REYNAUD, Y. LEFKIR, F. GARRELIE
Université de Lyon, Laboratoire Hubert Curien UMR 5516, Université Jean Monnet, Saint-Étienne, France
V. BARNIER
Mines St-Étienne, Université de Lyon, UMR 5307 LGF, Centre SMS, Saint-Étienne, France
C. FARRE, C. CHAIX
Université de Lyon, Institut des Sciences Analytiques UMR 5280, Université Lyon 1, Villeurbanne, France
L. MARTY, J. RENARD
Institut Néel, Université Grenoble Alpes, UPR CNRS 2940, Grenoble INP, Grenoble, France
Christophe.Donnet@univ-st-etienne.fr

Among various physical vapor deposition (PVD) processes used to produce graphene as an alternative route to chemical vapor deposition (CVD) processes, pulsed laser deposition (PLD) is a versatile process to synthetize graphene materials, mainly for dopant incorporation in a controlled and reproducible way to modulate the graphene properties. By considering a short review on graphene synthesis by PLD [1-4], the present contribution is focused on the synthesis and characterization of few-layer graphene and boron doped-graphene films obtained by vacuum thermal heating (500-900°C) of thin amorphous carbon-based films (a-C, a-C:B) synthetized by PLD in the presence of a nickel catalyst. The growth mechanism is highlighted on the basis of *in situ* XPS investigations during graphene growth [5]. The film characteristics are discussed mainly in terms of layer nano-architecture, lateral homogeneity and boron chemistry, on the basis of Raman, XPS/AES and HRTEM/EELS investigations. The effect of boron doping on graphene electronic or electrochemical properties is investigated. It will be shown that PLD can produce few-layer graphene (within 2-5 layers) with tunable properties through an accurate control of the boron doping concentration.

References

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