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 (α-C, α-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