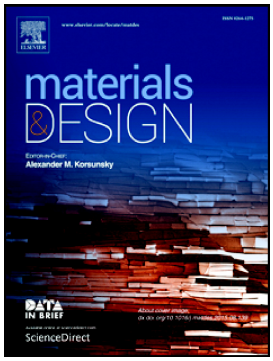

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Boron films produced by high energy Pulsed Laser Deposition

D. Dellasega [a,*], V. Russo [a], A. Pezzoli [a], C. Conti [b], N. Lecis [c], E. Besozzi [a], M. Beghi [a], C.E. Bottani[a], M. Passoni [a]

[a] Department of Energy, Politecnico di Milano, via Ponzio 34/3, 20133 Milan, Italy
[b] ICVBC, National Research Council, Via Cozzi 53, 20125 Milan, Italy
[c] Department of Mechanical Engineering, Politecnico di Milano, via La Masa 1, 20156 Milan, Italy

Abstract

Micron-thick boron films have been deposited by Pulsed Laser Deposition in vacuum on several substrates at room temperature. The use of high energy pulses (>700 mJ) results in the deposition of smooth coatings with low oxygen uptake even at base pressures of 10^{-4}-10^{-3} Pa. A detailed structural analysis, by X-Ray Diffraction and Raman, allowed to assess the amorphous nature of the deposited films as well as to determine the base pressure that prevents boron oxide formation. In addition the crystallization dynamics has been characterized showing that film crystallinity already improves at relatively low temperatures (800 °C). Elastic properties of the boron films have been determined by Brillouin spectroscopy. Finally, micro-hardness tests have been used to explore cohesion and hardness of B films deposited on aluminum, silicon and alumina. The reported deposition strategy allows the growth of reliable boron coatings paving the way for their use in many technology fields.

Keywords: Boron Coatings, Pulsed Laser Deposition, Raman Spectroscopy, Brillouin Spectroscopy, Micro-hardness