

Recent Advances related to R&D&I of Diamond-CVD and Diamond-like Carbon (DLC) at INPE and CVD Vale Diamante

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CVD Diamond and DLC films growth have been in evidence by scientific and technological studies due to their demand in terms of scientific research and a lot of applications. More specifically, the DLC films with its superior properties such as low coefficient of friction, high chemical inertness, high hardness, high wear resistance, biocompatibility, bactericide, etc., and CVD Diamond, also with its set of singular properties that qualifies them for immediate and near future applications of high value-added. In this presentation, for DLC films a modified PECVD (Plasma Enhanced Chemical Vapor Deposition) technique with the new concept of additional cathode as an ion and electron confinement system will be presented. It will be shown some results from first stage of research up to scaling up process for industrialization of different DLC coating with superior proprieties on metals, composites and plastics, with very high adhesion, lower coefficient of friction, high hardness, very low growth temperature and very low pressure. Applications on Space, Aeronautics, Metallurgical and Health areas will be presented. Regarding CVD Diamond, a remark of HFCVD (Hot Filament Chemical Vapor Deposition) and MWPACVD (Micro Wave Plasma Assisted Chemical Vapor Deposition) Techniques, for CVD diamond Poly and Single Crystal will be discussed. Also, studies from first stage of growing up to scaling up for industrial application with a lot of examples already in the market and for near future will be shown. Application on metallurgy, health, semiconductor, nuclear batteries, quantum computer devices will be exemplified.