CHARACTERIZATION THERMAL-OPTICAL OF DIAMOND-LIKE-CARBON FILMS BY PHOTOACOUSTIC TECHNIQUES

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Diamond-Like-Carbon (DLC) films is widely used in the biotechnology and science of the materials, as source of raw material in the manufacture of dental drill, biomedical implantations and for applications in dry lubrication systems. The manner as the sample is prepared influences the thermal and optics properties and the degree of adherence of the DLC film to the surfaces. Each application of this material depends strongly on these properties. One of the most important objectives of this work consists in relating the optics and thermal properties of these new materials with its applications. DLC films had been deposited in glass substrate in different times of deposition (5, 10, 20 and 30 min). Photoacoustic methods offer two possibilities as monitoring technique: spectroscopy monitoring and thermal diffusion. The first possibility gives important elements for the study of the energy bands of certain element since allows the attribution of the optics transitions involved. The other possibility allows to explore the measurement of thermal diffusivity for the study of parameters such as defects, degree of cristalinity, impurities and effect in the microstructure. In this work, two photoacoustic techniques have being applied for the characterization of the films: Photoacoustic Spectroscopy (PAS) and Open Photoacoustic Cell (OPC). Spectroscopic results showed the better absorption around 550 nm and minor transmission of the infra-red ray for samples with 30 and 20 min of deposition. Furthermore, the measures of thermal diffusivity presented an increase of this parameter with the reduction of time deposition.