Synthesis of Aluminum-doped Phosphate Glasses and optical characterization for application in biomaterials.

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Phosphate glasses have been studied for applications in bioactive materials, such as dental and bone tissue prostheses, due to their biocompatibility with the human body. In this work, phosphate glasses of structure 55P2O5-5ZnO-(40-x)Na2O-xAl2O3 (x = 0; 1; 3; 5 and 10% mol) were synthesized using the melt quenching technique. The reagents, in powder form, were mixed, placed in a porcelain crucible and taken to the oven at a temperature ranging from 950°C to 1050°C. The molten material was poured into preheated molds at an average temperature of 370°C. Subsequently taken to the oven with temperatures ranging from 340°C to 435°C for annealing. Spectroscopy characterizations were performed MIR (Mid - Infrared), NIR (Near - Infrared), UV-Vis, in order to obtain the absorption coefficient and Band Gap energy information of the materials. Time-resolved luminescence measurements were made to obtain the conduction band decay lifetime. The materials compared with the literature are promising for the application of bioactive glasses, due to their hygroscopic characteristic. Studies are being conducted with the aim of verifying the in vitro absorption capacity (SBF - Body Fluid Simulator).

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