

**108-023**

**SYNTHESIS, CHARACTERIZATION AND STUDY OF THE BIOACTIVITY OF B<sub>2</sub>O<sub>3</sub> BASED BIOGLASS**

Alves, L.C.F.(1); Gomes, J.F.(1); Portes, P.N.(2); Steimacher, A.(1); Pedrochi, F.(1);  
Universidade Federal do Maranhão(1); Universidade Federal do Maranhão(2); Universidade Estadual de  
Maringá(3); Universidade Federal do Maranhão(4); Universidade Federal do Maranhão(5);

Replacement of parts of living system by synthetic materials has resulted in the creation of a class of materials known as Biomaterials. The clinical use of glass as a biomaterial came up with the pioneering work of Larry Hench in the 60, with the development of Bioglass 45S5®. The main feature of this biocompatible material is its ability to promote a quick and durable chemical bonding by means of an apatitic interface, with the bone tissue, which earned him the designation of bioactive glass. Its development increased the research about restorations bone materials. The biggest disadvantage presented by bioglasses are the low mechanical strength and low fracture toughness, which have prevented their application in structural implants. Boron has some specific properties such as antiseptic (Borax), mechanical strength and thermal shock (borosilicate) and low toxicity in mammals. Recent studies have shown that the partial or complete replacement of SiO<sub>2</sub> in Bioglass® 45S5 by B<sub>2</sub>O<sub>3</sub>, leads to a complete and faster conversion of bioglass in Hydroxyapatite. Some research found that Boron based bioglass are favourable substrates for cell attachment and proliferation of osteogenic. The samples of the boron-based bioglass were obtained from the melting-quenching process with the following reagents CaO-B<sub>2</sub>O<sub>3</sub>-CaF<sub>2</sub>-P<sub>2</sub>O<sub>5</sub>-Na<sub>2</sub>O, then were thermally treated so that internal tensions are reduced and the glass get higher mechanical strength. The samples bioactivity is tested in SBF (Simulated Body Fluid) test and the characterization are done before and after this process. The mainly properties studied are: determination of volumetric mass density, differential thermal analysis (DTA) and x-ray diffractometry. The results are discussed in terms of the bioactivity compared to Bioglass® 45S5 and other compositions studied in the literature.