MS13-1-12 Comparative characterization of two new SiO_2–CaO–P_2O_5 bioactive glasses #MS13-1-12

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Abstract
In the course of the last years, the emergence of a new generation of mesoporous bioactive glasses (MBGs) opened a wide range of new potential applications such as drug and gene deliveries [1], DNA vaccination or cellular treatment. These new MBGs are also used as implants in the human body for bone regenerative purposes due to their high biocompatibility and high reactivity with the human physiological medium. When exposed to physiological fluids, MBGs develop a layer of crystalline bone-like carbonate calcium phosphate [Hydroxy-Carbonate Apatite, HCA: Ca10(PO4) 6 (OH) 2 (HA)] on their surface shortly after interaction [2-4], thus promoting fast integration of the implant with the host tissue. layer which provides direct bonding with the host tissue. Therefore, the glass bioactivity is usually evaluated by measuring the rate of HCA formation at the bioglasses surface on its exposure either to body fluids in vivo or to a simulated body fluid (SBF) in vitro. The internal porosity of these materials further allows for progressive colonization of the tissues, ensures the vascularization and free circulation of cells, body fluids and nutriments. In order to understand the various steps in the formation of HCA after immersion of the bioactive glass in the physiological liquid, starting from the interaction of water molecules with the pore wall species to the formation of nanoparticles and finally layers of crystalline HCA, we propose to study the structural organization during this evolution and hence derive the key parameter influencing the bioactivity. That way, we conducted a comparative study on two new bioactive glass 70S30C (70% SiO2, 30% CaO (mol. %)) and 58S (60% SiO2, 36% CaO, 4% P2O5 (mol.%)) prepared by appropriate Sol-Gel process [3]. We will present in this study the different results obtained and in particular the evaluation of their bioactivity after immersion in in a simulated body fluid (SBF) for different interaction time (immersion time: 1d, 2d, 3d and 7 days).

References
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Figure 1 Image that shows the full process of the