Phosphate based glasses for biomedical applications: Effect of composition

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For the last few decades, there has been a growing interest in using glasses for biomedical applications. Phosphate based glasses (PBGs) are known to show good bioactive characteristics and could be potentially used as favourable templates for bone-tissue formation. Phosphate glasses are unique group of materials that offer great potential for hard and soft tissue engineering over other types of bioactive glasses due to their fully resorbable characteristics, with some formulations possessing chemical composition similar to the mineral phase of natural bone. The biocompatibilities of these glasses are hugely affected by the glass composition which could be easily altered via the addition of different modifying oxided. The main aim of this current work was to establish a relationship between the ion release and cytocompatibility of PBGs. Different modified oxides (Fe_2O_3, B_2O_3, SrO) were added to the glasses in order to observe the effect of composition on the durability of the glasses. Ion release studies were conducted using Inductively Coupled Plasma Spectroscopic method. In order to observe the relationshop between the ion release, degradation rate and cytocompatibility of the glasses cell culture studies were conducted using human osteoblast like (MG63) cell lines. It was revealed that the glasses containing both B_2O_3 and Fe_2O_3 maintained and showed higher cell viability as compared to the only Fe_2O_3 or B_2O_3 or SrO containing glasses. This positive effect of glass compostion on the cytocomapatibility properties of PBGs was mainly associated with the degradation rate and corresponding ion release.

Biography

Nusrat Sharmin is currently working as an Assistant Professor at the University of Nottingham Ningbo China in the Department of Chemical and Environmental Engineering. Her field of expertise is fibre reinforced composites for biomedical, marine and aerospace applications. Her current research is focused on the use of phosphate glass fibres to reinforce bioresorbable polymers for bone fracture fixation applications. She has completed her PhD in Materials Engineering and Materials Design from The University of Nottingham UK. She has published more than 15 papers on biomaterials.

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