

DEVELOPMENT OF GLASS-CERAMICS FROM B-CONTAINING WASTE AND MEAT BONE ASH COMBINATIONS WITH ADDITION OF WASTE GLASS, THEIR CYTOTOXIC CHARACTERISTICS

B.ÇİCEK, A. TUCCI, E. BERNARDO, A.R. BOCCACCINI

ABSTRACT

Glass-ceramic materials represent a great resource for environmental cleanup, because they can stabilize pollutants by vitrification and, at the same time, they may present remarkable mechanical and functional properties enabling novel applications. In this paper, different mixes of three different industrial wastes, namely boron waste (BW), meat bone and meal ash (MBM) and recycled soda lime silica glass (SLG) were prepared by considering the combined effects of thermal cycle requirement, particle sizes of the selected wastes and amount (content) of boron waste. Glass-ceramics were prepared from selected waste mixtures and the physical and mechanical properties of the obtained glass-ceramics were measured. The results underline that boron containing waste-derived glass-ceramics are attractive for applications as gas concrete blocks or as an additive in new generation insulation ceramics.

Generally studies on glass ceramics production from wastes claim that glass-ceramic matrices encapsulate toxic components (in their glass matrix phase) and that the materials are safe. However only rarely cytotoxic studies on waste derived materials have been carried out. That is why in the present study cytotoxicity studies were carried out on the new glass-ceramics, introducing the concept of cell biology testing of waste-derived products.