Nanocomposites and nanomaterials

Influence of preparation on the microstructure of manganese borosilicate glasses after acid treatment

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Manganese-borosilicate glasses are interesting because of their microstructure and electrical properties which are atypical for majority of glasses. If the concentration of manganese ions is small they are dispersed in borosilicate glass matrix, but when it is high, they create separated clusters [1, 2]. We observed that in the glass with a high amount of MnO a separation of two phases occurs [3]. There are some suggestions that one phase is MnO-rich and the other is SiO_2-B_2O_3 -reach [1]. If it had been true, an acid treatment made using HCl would have dissolved only one phase. However, SEM micrographs show highly porous SiO_2 structure which more resemble aerogel than solid with empty areas after the etching.

In order to check the influence of the glass preparation process on the final microstructure, we prepared several samples containing different amount of SiO2 and examined them by SEM, EDS and IR spectroscopy.

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