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Effect of iron state on crystallization and dissolution in Fe_2O_3-CaO-SiO_2 glasses

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The possibility of iron-containing glasses as thermoseeds for hyperthermia of bone tumor was reported previously. There is, however, no report about the effect of iron state on the crystallization of magnetite and the resultant properties. The iron states were determined by Mössbauer spectroscopy in Fe_2O_3-CaO-SiO_2 system.

It was found that the higher CaO content interrupts the crystallization of magnetite crystallites as well as the oxidation of iron, that is, the transformation from Fe^{3+} to Fe^{2+}. A sample containing large amounts of Fe^{2+} showed the faster increment of temperature when the alternating magnetic field was applied. In order to use the thermoseed for a hyperthermia, we can say that the composition with low CaO content is most useful.