

PROCESSING AND MAGNETIC PROPERTIES OF BIOCERAMICS

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Bioactivity of ferromagnetic glass-ceramics originates from the calcium phosphate that forms apatite in a physiological environment. Their magnetic properties have been shown to be effective in hyperthermic treatment of animal bone cancer. Correlations between processing, structure, and magnetic properties are presented. A series of samples in the system $45(\text{CaO}, \text{P}_2\text{O}_5) y\text{SiO}_2 x\text{Fe}_2\text{O}_3$ were synthesized with varying the processing parameters. X-ray powder diffraction reveals a strong effect of the processing parameters on the qualitative and the quantitative composition of the samples. They all are multiphase systems of 3 or 4 phases. The major phase is calcium phosphate, while hematite and/or magnetite determine their magnetic properties. Magnetic measurements illustrate a strong dependence of the saturation magnetization and hysteresis loss of the biomaterial from the processing parameters. A systematic study of the physical properties in series of ferromagnetic bioceramics is in progress.

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