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EFFECT OF MAGNESIUM CONTENTS ON THERMAL PHASE TRANSITION OF TRICALCIUM PHOSPHATE

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Tricalcium phosphate [$\text{Ca}_3(\text{PO}_4)_2$; TCP] is a biocompatible and biore-sorbable material and has been applied in biomedical field to bone filler. The TCP exhibits complex thermal changes because its various solid solutions are relatively stable. In the present study, the phase transition of TCP containing Mg^{2+} was investigated by high temperature x-ray diffractometry. Effect of Mg^{2+} contents on thermal phase transition of the TCP was discussed.

The TCP with Mg^{2+} contents of 0.01, 0.13, and 0.32% were synthesized by adding H_3PO_4 solution to $\text{Ca}(\text{OH})_2$ suspension. Powder of MgO was added to several batches of the suspension.

The β - α transformation occurred at a temperature ranging from 1050 to 1100°C. The reflection peaks unassignable to α nor β phase in the high temperature XRD pattern of at 950°C suggested the existence of intermediate phase. After being heated at 1200°C for 1 h in air, the β -TCP with 0.01% Mg changed into single phase of α -TCP and preserved its structure after being cooled to rt, whereas the other samples consisted of β phase after cooled to rt. After being heated at 1600°C, all of the samples were biphasic of β - and α -TCP. It was suggested that the content of Mg ions affected the β - α phase transition of TCP.

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