Preparation of macroporous tricalcium phosphate scaffolds for tissue engineering

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ABSTRACT

There are many types of bone substitute material, such as bioactive glass-ceramic (45S5R), hydroxyapatite (HAp), tricalcium phosphate (TCP), tetracalcium phosphate (TTCP) and so on. Among the above, HAp will transforms to α or β phase of TCP by different heat treatment conditions; the degradation rate of α-TCP is faster, and it also has the good osteoconductive ability, while β-TCP has the good biocompatibility, and it also has degradation ability, Therefore, they are suitable as a bone graft substitute. In present work, efforts were focused on development of porous calcium phosphate ceramics using stearic acid as pore-forming agent. The results showed that β-TCP, α / β-TCP and α-TCP ceramics could be obtained by sintering at T4, T5 and T7 respectively. The pore structure and pore size of the different crystallization of porous calcium phosphate ceramic were observed by scanning electron microscopy(SEM). Finally, after soaking in distilled water solution, there was no significant changed of porous HAp ceramic, the degradation behavior of porous β-TCP/HAp ceramic could be observed, and The surface apatite layer formed on porous α-TCP/ β-TCP/HAp and α-TCP/HAp ceramics could be observed.

Keywords : Calcium phosphate ceramic、Crystalline phase、Scaffold、Pore structure

Table of Contents

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