PREPARATION OF POROUS CERAMICS COMPOSED OF β -Ca(PO₃)₂ FIBER SKELETON AND THEIR COMPRESSIVE STRENGTH BEHAVIOR

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Abstract High-strength calcium metaphosphate fibers are extracted from crystallized products of ultraphosphate glasses by aqueous leaching. Porous ceramics with skeleton of β -Ca(PO₃)₂ fibers are prepared by the sintering of the fibers. In the present work, porous ceramics having a large porosity of ~70% were obtained. The compressive test of these porous ceramics showed that a large strain of 0.2 - 0.3 are requisite for their fracture; the calcium phosphate porous ceramics in this work show much higher flexibility than conventional ceramics. The present work discusses influence of the preparation conditions of the porous ceramics on their compressive strength behavior.

INTRODUCTION

Porous bioceramics are very important materials for applications such as artificial bones. Their advantage is that the porous bioceramics are mechanically anchored by the high convoluted growth of natural bone into the pores. It is reported that the materials with large-sized, open continuous pores (eg. 50 - 200 μ m) and with large porosity (eg. >60%) are requisite for development of new bone tissues in the ceramics.¹⁻³

Our earlier works imply that the crystalline β -Ca(PO₃)₂ fibers have high strength and flexibility with biocompatibility.^{4,5} We reported preparation of β -Ca(PO₃)₂ fibers⁶ and new types of porous ceramics prepared by using these fibers.⁷ We expect that the porous ceramics show some characteristic mechanical properties such as flexibility, and believe that the porous materials have great potential in use as biomaterials. The preparation conditions of the porous ceramics containing β -Ca(PO₃)₂ fibers and their compressive strength behavior were investigated in the present work.

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