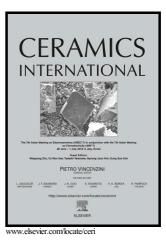
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ACCEPTED MANUSCRIPT

Fabrication and Characterization of Porous Biphasic β-Tricalcium Phosphate/Carbonate Apatite Alginate Coated Scaffolds

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Abstract

In this research, biphasic β -tricalcium phosphate/carbonate apatite (β -TCP/CO₃Ap) scaffolds incorporated with alginate were fabricated. Sodium alginate was extracted from local brown seaweed, Sargassum Polycystum via calcium alginate process. Biphasic β-TCP/CO₃Ap scaffolds were fabricated by polymer reticulate method. β -TCP slurry was infiltrated into the polyurethane foam (PU) foam, then sintered up to 1300 °C, soaked for 4 hours and immediately quenched in still air to form biphasic β -TCP/ α -TCP scaffold. Biphasic β -TCP/ α -TCP scaffold was then transformed to biphasic β -TCP/CO₃Ap scaffold by dissolution-precipitation reaction with 1 M of NaHCO₃ at 170 °C for 1, 3 and 5 days. Biphasic β-TCP/CO₃Ap scaffold from 5 days dissolution-precipitation reaction was chosen to incorporate with 1%, 3% and 5% of sodium alginate, respectively, as it has the highest composition of CO₃Ap phase. FTIR and FESEM analysis confirmed the presence of characteristic functional groups of sodium alginate. Mechanical strength of biphasic β-TCP/CO₃Ap scaffold improved by increasing the concentration of sodium alginate. The highest mechanical strength achieved was 26.38 kPa for biphasic β-TCP/CO₃Ap scaffold with 5% sodium alginate coating and it was chosen to further study with the addition of Download English Version:

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