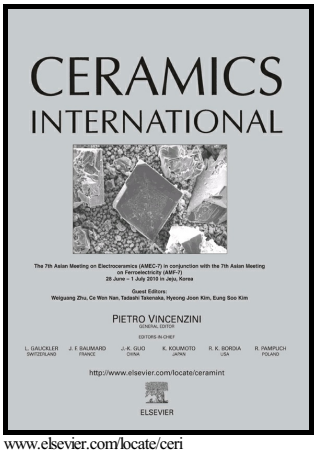

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PII: S0272-8842(18)30482-6
DOI: https://doi.org/10.1016/j.ceramint.2018.02.168
Reference: CERI17570

To appear in: *Ceramics International*

Received date: 26 December 2017
Revised date: 9 February 2018
Accepted date: 21 February 2018

Cite this article as: Yong Xuan Hui, Muhammad Iqbal Mazlam and Nurazreena Ahmad, Fabrication and Characterization of Porous Biphasic β-Tricalcium Phosphate/Carbonate Apatite Alginate Coated Scaffolds, *Ceramics International,* https://doi.org/10.1016/j.ceramint.2018.02.168

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/CO_3Ap) scaffolds incorporated with alginate were fabricated. Sodium alginate was extracted from local brown seaweed, *Sargassum Polycystum* via calcium alginate process. Biphasic β-TCP/CO_3Ap 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/CO_3Ap scaffold by dissolution-precipitation reaction with 1 M of $NaHCO_3$ at 170 °C for 1, 3 and 5 days. Biphasic β-TCP/CO_3Ap 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 CO_3Ap phase. FTIR and FESEM analysis confirmed the presence of characteristic functional groups of sodium alginate. Mechanical strength of biphasic β-TCP/CO_3Ap scaffold improved by increasing the concentration of sodium alginate. The highest mechanical strength achieved was 26.38 kPa for biphasic β-TCP/CO_3Ap scaffold with 5% sodium alginate coating and it was chosen to further study with the addition of