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In vitro bioactivity of a biocomposite HA/ZrO_2 fabricated from bovine bone by high energy ball milling technique

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The superior biocompatibility and bioactivity of hydroxyapatite (HA) ceramic has attracted much attention as a substitute material in bone grafting. In the present work, the HA was produce from bovine bone while zirconia powder was supplied by the China (Mainland) trading company. In this work, HA/ZrO_2 biocomposite prepared with different wt % (0.0, 0.2, 0.4 and 0.8) of ZrO_2 concentrate, sintered at 1250 °C, 1 h milling time. In this project, the bioactivity test was carried out by soaking the sample in simulated body fluid SBF solution, 7 and 15 days in an incubator maintained at 36.5 °C. For instance, bioactivity was studied by soaking the samples in the SBF solution followed by the SEM, EDX analysis as well as XRD. The SEM results showed the apatite on the surface of HA/ZrO_2 biocomposite on a 7 days growth and when the immersion time increased to 15 days, the growth of apatite on the surface increased more. Other than that, the EDX showed that the covered layer on the surface was P and Ca as well as O. The XRD results showed that the soaked HA/ZrO_2 biocomposite composed HA, α-TCP, β-TCP and ZrO_2 and no other phases were detected.

Recent Publications

1. Barakat N A, Khil M S, Omran A, Sheikh F A and Kim H Y (2009) Extraction of pure natural hydroxyapatite from the bovine bones bio waste by three different methods. Journal of Materials Processing Technology 209(7):3408-15.
2. Chavan P N, Bahir M M, Mene R U,Mahabole M P and Khairnar R S (2010) Study of nanobiomaterial hydroxyapatite in simulated body fluid: Formation and growth of apatite. Materials Science and Engineering:B 168(1):224-230.
3. Radha G, Balakumar S, Venkatesan B and Vellaichamy E (2015) Evaluation of hemocompatibility and *in vitro* immersion on microwave-assisted hydroxyapatite-alumina nanobiocomposite. Materials Science and Engineering C: Materials for Biological Applications 50:143-150.
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5. Mittal M, Nath S and Prakash,S (2013) Improvement in mechanical properties of plasma sprayed hydroxyapatite coatings by Al2O3 reinforcement. Materials Science and Engineering: C 33(5):2838-2845.

Biography

Fatemeh Mohammaddoost has obtained her Master's degree in Material Science and Engineering from University Putra Malaysia. She has her expertise in biomaterial, synthesis from bio waste to use as a medical replacement. Her studies based on high energy ball milling technique to improve the physical properties which is a new method to synthesis hydroxyapatite from bio waste, to create new pathways for improving medical application by simulation body fluid test.

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