

Hydrothermal Sintering under Mild Temperature Conditions: Preparation of Calcium-deficient Hydroxyapatite Compacts

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Calcium-deficient hydroxyapatite (CDHA) prepared by the coprecipitation method was solidified by the hydrothermal hot-pressing technique, and compacts of CDHA with high bulk density beyond 80 % were obtained at 200 °C. Each reaction parameter, *viz.* reaction temperature, pressure, and time, was systematically changed from the standard conditions to investigate its effects on density, Vickers hardness, and Ca/P ratio of the compacts obtained. The reaction temperature and pressure had a large effect on densification, but not the reaction time because the densification proceeds in a short time. The densification by hydrothermal hot-pressing involved dissolution and precipitation of the starting CDHA powder, so that the Ca/P ratio changed from 1.52 of the starting powders to 1.61 of the compact obtained by hydrothermal hot-pressing at 200 °C and 35 MPa for 24 h with the addition of 10 wt.-% water.

Key words: Calcium-deficient Hydroxyapatite, Hydrothermal Hot-Pressing, Hydrothermal Sintering, Low-temperature Densification, Ca/P Ratio