Formation and Structure of ZrO₂ Added Hydroxyapatite Synthesized from Waste Egg shells

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Abstract

Stabilized zirconia (ZrO₂) added hydroxyapatites were synthesized from waste egg shells at different percent weigh from 1 to 15 with an increment 2 percent weight by precipitation method. The samples were dried at 100 °C for 48 h, ground with pestle and mortar into powder and heated from 200 to 1300 °C. Structure properties of samples before and after heating were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscope (SEM). The XRD results show that the samples composed hydroxyapatite and zirconium dioxide (ZrO₂) phase. Hydroxyapatite phase had higher crystal structure phase after heated at 1200 °C. At 1300 °C, the sample were transformed to calcium zirconium dioxide (CaZrO₄) phase. The composited of samples were confirmed by FTIR results. The morphology and dispersive particle of samples were investigated by SEM.

Introduction

Stabilized zirconia (ZrO₂) added hydroxyapatites were synthesized from waste egg shells at different percent weigh from 1 to 15 with an increment 2 percent weight by precipitation method. The samples were dried at 100 °C for 48 h, ground with pestle and mortar into powder and heated from 200 to 1300 °C. Structure properties of samples before and after heating were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscope (SEM). The XRD results show that the samples composed hydroxyapatite and zirconium dioxide (ZrO₂) phase. Hydroxyapatite phase had higher crystal structure phase after heated at 1200 °C. At 1300 °C, the sample were transformed to calcium zirconium dioxide (CaZrO₄) phase. The composited of samples were confirmed by FTIR results. The morphology and dispersive particle of samples were investigated by SEM.

Results and discussions

Effects of ZrO₂ added in hydroxyapatite from egg shells

Conclusion

Hydroxyapatite from chicken egg shells were synthesized by precipitation method and added ZrO₂ at the various percent weight of ZrO₂ from 0 to 15. The amount of ZrO₂ content for the samples were nondestructive the hydroxyapatite phase. The small particles of ZrO₂ were dispersed among the particles of hydroxyapatite. The experiment results indicated that the ZrO₂ added into hydroxyapatite can be applied to improve physical properties of hydroxyapatite.

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References