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Abstract

Needle-like hydroxyapatite nanoparticles were successfully synthesized *via* a reaction between calcium oxide (CaO) that was obtained from calcined limestone and orthophosphoric acid (H_3PO_4) under ultrasonic irradiation at 25^oC. The reaction systems were exposed to ultrasonic waves of 20 kHz for various times ranging from 0 to 4 h. The initial and final pH values of the mixtures of CaO and H_3PO_4 solution were continuously observed (pH<4.0) after ultrasonic irradiation. The powder was then dried at 60^oC and calcined at 300 ^oC for 3 h (3 ^oC/min). The products were characterized using X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and transmission electron microscopy (TEM). The results showed that the formation of needle-like hydroxyapatite (HAp) nanoparticles was substantially accelerated compared with the reaction without ultrasonic irradiation. The HAp phase was increasingly visible with longer ultrasonic irradiation time compared with the monetite phase ($CaHPO_4$). This