

Accepted Manuscript

Ultrasonic-assisted conversion of limestone into needle-like hydroxyapatite nanoparticles

Jutharatana Klinkaewnarong, Songkot Utara

PII: S1350-4177(18)30359-6

DOI: <https://doi.org/10.1016/j.ultsonch.2018.04.002>

Reference: ULTSON 4139

To appear in: *Ultrasonics Sonochemistry*

Received Date: 5 March 2018

Revised Date: 7 April 2018

Accepted Date: 7 April 2018

Please cite this article as: J. Klinkaewnarong, S. Utara, Ultrasonic-assisted conversion of limestone into needle-like hydroxyapatite nanoparticles, *Ultrasonics Sonochemistry* (2018), doi: <https://doi.org/10.1016/j.ultsonch.2018.04.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Ultrasonic-assisted conversion of limestone into needle-like hydroxyapatite nanoparticles

Jutharatana Klinkaewnarong^a and Songkot Utara^{b,c,*}

^a Department of Physics, Faculty of Science, Udon Thani Rajabhat University, Udon Thani 41000, Thailand

^b Polymer and Material Research Groups, Faculty of Science, Udon Thani Rajabhat University, Udon Thani 41000, Thailand.

^c Division of Chemistry, Faculty of Science, Udon Thani Rajabhat University, Udon Thani 41000, Thailand.

* Corresponding author

E-mail address: songkot_u@hotmail.com; songkot@udru.ac.th

Abstract

Needle-like hydroxyapatite nanoparticles were successfully synthesized *via* a reaction between calcium oxide (CaO) that was obtained from calcined limestone and orthophosphoric acid (H₃PO₄) under ultrasonic irradiation at 25°C. 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 H₃PO₄ solution were continuously observed (pH<4.0) after ultrasonic irradiation. The powder was then dried at 60°C and calcined at 300 °C for 3 h (3 °C/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 (CaHPO₄). This

Download English Version:

<https://daneshyari.com/en/article/7702354>

Download Persian Version:

<https://daneshyari.com/article/7702354>

[Daneshyari.com](https://daneshyari.com)