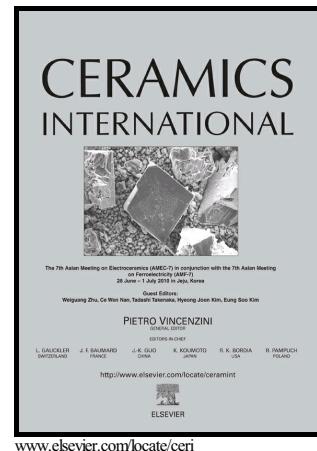


# Author's Accepted Manuscript

Hydration reactions and physicochemical properties in a novel tricalcium-dicalcium silicate-based cement containing hydroxyapatite nanoparticles and calcite: a comparative study

Yoshamin Abnoba Moreno-Vargas, Juan Pedro Luna-Arias, José Ocotlán Flores-Flores, Eligio Orozco Mendoza, Lauro Bucio Galindo



PII: S0272-8842(17)31441-4

DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.07.027>

Reference: CERI15747

To appear in: *Ceramics International*

Received date: 28 April 2017

Revised date: 21 June 2017

Accepted date: 4 July 2017

Cite this article as: Yoshamin Abnoba Moreno-Vargas, Juan Pedro Luna-Arias, José Ocotlán Flores-Flores, Eligio Orozco Mendoza and Lauro Bucio Galindo. Hydration reactions and physicochemical properties in a novel tricalcium dicalcium silicate-based cement containing hydroxyapatite nanoparticles and calcite: a comparative study, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2017.07.027>

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 galley proof before it is published in its final citable 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

Hydration reactions and physicochemical properties in a novel tricalcium-dicalcium silicate-based cement containing hydroxyapatite nanoparticles and calcite: a comparative study

Yoshamin Abnoba Moreno-Vargas<sup>a</sup>, Juan Pedro Luna-Arias<sup>b</sup>, José Ocotelán Flores-Flores<sup>c</sup>, Eligio Orozco Mendoza<sup>d</sup>, Lauro Bucio Galindo<sup>d\*</sup>

<sup>a</sup>Programa de Doctorado en Nanociencias y Nanotecnología, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Cinvestav-IPN), Av. Instituto Politécnico Nacional 2508, Col. San Pedro Zacatenco, C.P. 07360, Ciudad de México, México.

<sup>b</sup>Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Cinvestav-IPN), Av. Instituto Politécnico Nacional 2508, Col. San Pedro Zacatenco, C.P. 07360, Ciudad de México, México.

<sup>c</sup>Centro de Ciencias Aplicadas y Desarrollo Tecnológico, Universidad Nacional Autónoma de México (UNAM), CU, 04510 Ciudad de México, Mexico.

<sup>d</sup>Laboratorio de Cristalofísica y Materiales Naturales, Instituto de Física, Universidad Nacional Autónoma de México (UNAM), Circuito de la Investigación Científica, Ciudad Universitaria C.P. 04510 Ciudad de México, México.

yuyifumamapi@gmail.com  
jpluna@cell.cinvestav.mx  
jpluna@cinvestav.mx,  
ocotlan.florres@ccadet.unam.mx  
elgio@fisica.unam.mx  
bucio@fisica.unam.mx

\*Corresponding author: Tel.: +52 55 56225012,

## Abstract

The mineral trioxide aggregate (MTA) is Portland type cement whose main application in odontology is retrograde filling. The purpose of this study was to analyze hydration reactions and physicochemical properties of a new tricalcium-dicalcium silicate-based cement containing nanocrystalline hydroxyapatite (nHAp) and calcite. The new formulation was compared with BiodentineTM and MTA-AngelusTM as control samples.

Hydration reactions were monitored by Raman spectroscopy, X-ray diffraction, radiopacity, pH, setting time, and compressive strength. The compressive strength reaches its higher value at 7 days following the sequence: BiodentineTM (104.8 MPa) > Cement + 5% nHAp (59 MPa) > MTAAngelusTM (27.3 MPa), in agreement with the pH values measured at 24 h: BiodentineTM, Cements + nHAp or + calcite (10.6-11.6) >

Download English Version:

<https://daneshyari.com/en/article/5437826>

Download Persian Version:

<https://daneshyari.com/article/5437826>

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