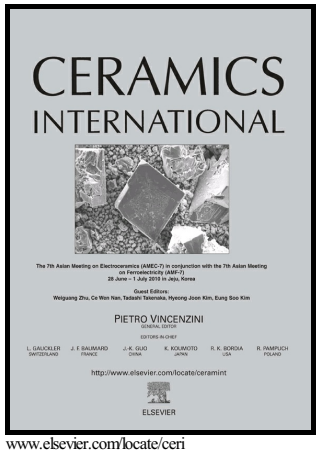

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Abstract

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) >