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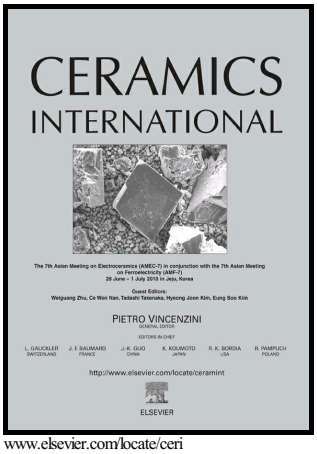

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PII: S0272-8842(17)30664-8
DOI: http://dx.doi.org/10.1016/j.ceramint.2017.04.057
Reference: CERI15037

To appear in: *Ceramics International*

Received date: 22 February 2017
Revised date: 31 March 2017
Accepted date: 10 April 2017

Cite this article as: V.F. Shamray, V.P. Sirotinkin, I.V. Smirnov, V.I. Kalita, A.Yu. Fedotov, S.M. Barinov and V.S. Komlev, Structure of the hydroxyapatite plasma-sprayed coatings deposited on pre-heated titanium substrates, *Ceramic International,* http://dx.doi.org/10.1016/j.ceramint.2017.04.057

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Abstract

Plasma spraying is the most commonly used thermal spray method for the application of hydroxyapatite (HA, $Ca_{10}(PO_4)_6(OH)_2$) coatings. In the present study, the HA coatings were plasma spraying deposited onto plates of titanium pre-heated to 20°C, 300°C and 550°C. The obtained HA coatings were investigated by means of X-ray diffraction and scanning electron microscopy. It is found that the coatings, in addition to HA, contain the tetracalcium phosphate (TTCP, $(Ca_4(PO_4)_2O)$ phase (~ 10%) and a small amount of CaO (< 2%). Crystal structure of HA in the coatings is revealed to be distorted. The PO4 tetrahedrons are deformed (Baur distortion coefficient D1(TO) ~ 0.2). The distances Ca1-O1 and Ca1-O2 are changed as compared to these in stoichiometric hydroxyapatite. These distortions are considered as a result of internal stresses, which are demonstrated in the broadening of peaks on X-ray diffraction pattern of HA. Microstructure of