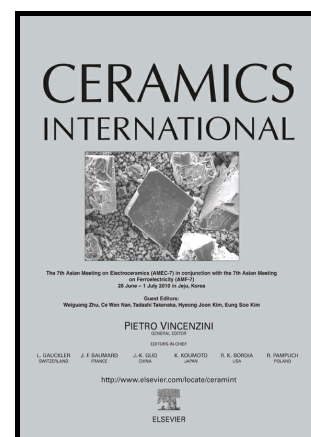


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# Structure of the hydroxyapatite plasma-sprayed coatings deposited on pre-heated titanium substrates

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## Abstract

Plasma spraying is the most commonly used thermal spray method for the application of hydroxyapatite (HA,  $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ ) 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,  $(\text{Ca}_4(\text{PO}_4)_2\text{O})$  phase (~ 10%) and a small amount of CaO (< 2%). Crystal structure of HA in the coatings is revealed to be distorted. The  $\text{PO}_4$  tetrahedrons are deformed (Baur distortion coefficient  $D1(\text{TO}) \sim 0.2$ ). 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

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