

NEAR-SURFACE IN-VITRO STUDIES OF PLASMA SPRAYED HYDROXYAPATITE COATINGS

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Abstract

Coatings of plasma sprayed hydroxyapatite (HAp), widely used in reconstructive surgery and dental implants, were characterized for near-surface studies using laboratory X-rays sources. Subsequent to spraying, the samples were incubated in simulated body fluid between 1 and 56 days. Quantitative phase analysis, employing TOPAS software, showed an opposite trend in the two main phases of the coating *viz.* HAp and tetracalcium phosphate (TTCP). The former increased within the first seven days of incubation whilst the latter decreased during the same period; however both phase stabilized with further incubation. The crystallinity of the coatings exhibited a trend similar to that of HAp, an increase in the early stages of incubation followed by stabilization with longer incubation times. Results of residual stress determined with a D8 DISCOVER from BRUKER AXS and analyzed using LEPTOS software, showed both the normal stress tensor components σ_{11} and σ_{22} to be tensile decreasing gradually with incubation time.