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(Research Article)
Investigation of the effect of electrolyte on acoustical behaviour of ceramic coatings produced by method Plasma Electrolytic Oxidation (PEO) on titanium

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Abstract

In this paper, titanium oxide coating (TiO_2) was produced on titanium alloy Ti6Al4V by Plasma Electrolytic Oxidation (PEO) Method. Sodium Silicate (Na_2SiO_3) and Sodium Aluminate ($NaAlO_2$) based electrolytes were selected in PEO process. The effects of concentration of Sodium Aluminate (0, 2.5, 5, 7.5, and 10 g/L) on the microstructure and acoustical behaviour of the formed coatings were studied. The results show that maximum value of sound absorption coefficient from 0.17 for the bare sample increased to 0.48 for the sample which was coated in an electrolyte with the combination of 10g/L Na_2SiO_3 and 10g/L $NaAlO_2$ (sample A10). This acoustical behaviour was related to the coating characteristics. So that in the sample with 10g/L $NaAlO_2$ (A10) has minimum size of the pores and maximum thickness and porosity comparison to other coatings.

Keywords: Titanium, Plasma Electrolytic Oxidation (PEO), Acoustical behaviour, Sodium Aluminate.

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