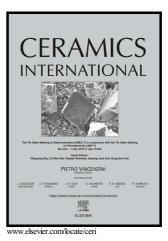
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ACCEPTED MANUSCRIPT

Electrophoretic deposition of fiber hydroxyapatite/titania nanocomposite coatings

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Abstract

Hydroxyapatite/titania nanocomposite coatings were electrophoretically deposited from ethanolic suspensions of titania and fiber shaped hydroxyapatite (FHA) nanoparticles. Triethanolamine (TEA) was used to enhance the colloidal stability of particles in suspensions. Electrophoretic deposition (EPD) was performed using the suspensions with different concentrations (wt%) of titania/FHA particles. EPD rate decreased more rapidly with time for suspensions with higher wt% of FHA due to the higher voltage drop over the deposits shaped from them. Stacking of long FHA particles on the substrate during EPD resulted in the formation of coarse pores in the deposits. It was found that titania nanoparticles can more efficiently infiltrate through and fill the pores in TEA containing suspensions due to the stronger electrostatic repulsion force between pore walls (FHA) and titania nanoparticles in them. The coatings deposited from the suspensions with 50 wt% of FHA or more did not crack during drying due to the significant reinforcement action provided by high wt% of FHA in them. Download English Version:

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