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# Electrophoretic deposition of titania nanostructured coatings with different porous patterns

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## Abstract

Titania nanostructured coatings with different porous patterns were fabricated by electrophoretic deposition (EPD) in isopropanolic suspension including different concentrations of carbon active (CA) or carbon black (CB) particles as the porogen additives. Finer and negatively charged CA particles were electrostatically adsorbed on the coarser and positively charged titania particles and formed CA-titania particles. While, finer and positively charged titania particles were electrostatically adsorbed on the coarser and negatively charged CB particles to form titania-CB particles. Both CA-titania and titania-CB particles had the net positive surface charge and so cathodic EPD was applicable. EPD was carried out at optimized conditions of 60V and 10s. Thermogravimetry (TG) analysis showed that CA and CB burn out between 450-600°C. The higher the carbon content in the suspension the higher was their content in the coating. The coatings were characterized by SEM, AFM, adhesion strength and bioactivity tests. Even coatings with interconnected fine pores and low roughnesses were obtained after the heat treatment of CA-titania coatings. While, rough coatings with coarse and isolated pores were obtained after the heat treatment of titania-CB coatings. The porosity of coating increased as the

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