Effect of MgO MicroParticles on Characteristics of Microarc Oxidation Coatings Fabricated on Pure Titanium

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Microarc oxidation coatings were successfully fabricated on TA2 pure titanium by the microarc oxidation method in electrolyte solutions using different concentrations of MgO microparticles (0~4 g/L). The effect of MgO microparticles on the surface morphologies, composition and properties of the MAO coatings was investigated. It was observed that the concentration of MgO microparticles had a significant impact on the characteristics of the MAO coatings. With increasing concentrations of MgO microparticles, the oxidation voltage increased, and the microhardness, thickness and interface adhesion of the MAO coatings increased. The surface roughness of the MAO coatings gradually increased. MAO coatings are mainly composed of SiO₂, rutile, anatase, MgTiO₃ and MgO. The corrosion rates exhibited a trend from decreasing to increasing rates. The samples exhibited good thermal shock resistance properties.

Keywords: Microarc oxidation; MgO microparticles; Pure titanium; Characteristics

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