Influence of cathodic current density on properties of ceramic coatings on 6063 aluminum alloy by micro-arc oxidation×

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The ceramic coatings were prepared by a micro-arc oxidation (MAO) process upon 6063 Aluminum Alloy in the environmentally friendly electrolyte of silicate, and the effect of cathodic current density was studied. The results show that cathodic current density plays an important role to obtain a comprehensive performance for the ceramic coating. With the increase of cathodic current density, the color of the coatings gradually changes from light white to brown under natural light. The thickness and the surface micro-hardness of the coatings increase initially and then decrease, the maximum thickness was nearly 5 times thicker than the ordinary one, which is about 13.6 μm . The friction coefficient and the corrosion resistance of the coatings have the same variation trend with the thickness, the surface micro-hardness increases nearly 8 times, the corrosion resistance is almost 10 times better than that of the substrate in 10 min, and the friction coefficient of the coatings is increases 2 times.

Keywords: Aluminum alloy, Micro-arc oxidation, Micro-hardness, Corrosion resistance, Wear resistance

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