Effect of aluminates electrolytes on growth of ceramic coatings on Al2021 alloys prepared by electrolytic plasma processing

Sang Sik Byeon, Kai Wang, Chan Gyu Lee, Bon Heun Koo*

School of Nano & Advanced Materials Engineering (bhkoo@changwon.ac.kr), Changwon National University

Abstract

Ceramic coatings were prepared on Al alloy 6061 by the electrolytic plasma processing (EPP) method. The experiments were carried out on 2021 Al alloy in alkaline electrolytes which are eco-friendly and low-cost. The experimental electrolyte composition includes: 0.5-2 g/L NaOH as the electrolytic conductive agent, 2-30 g/L $NaAlO_2$ as alumina formative agent, 0.1-1 g/L Na_3SiF_6. The EPP treatment was carried out in 15min and at room temperature. Analysis show that the double-layer structure oxide layer consist of different states such α-Al_2O_3 and γ–Al_2O_3 using XRD, SEM, and then the micro hardness of the coating layers in 10 different places was measured.

Keywords: Electrolytic Plasma Processing, Aluminum Alloy, Electrolyte, Ceramic Coating