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PLASMA ELECTROLYTIC OXIDATION OF PSA PRE-ANODIZED AA2024 ALLOY

The method of plasma electrolytic oxidation (PEO) allows the formation of wear and corrosion resistant coatings with good adhesion to the alloy surface [1]. However, there is a need for PEO processing not only on the bare alloy surface but also with the pre-applied anodic layers [2]. This study combines various conditions of PEO-treatment of AA2024 aluminum alloy with preliminary formed phosphoric-sulfuric acid (PSA) anodized layer. Three different voltages (350, 400, and 450 V) and three different times (5, 15, and 30 min) were considered during PEO processing.

The microstructure, morphology, and composition of formed PEO coatings were investigated using scanning electron microscopy (SEM), X-ray diffraction (XRD), and glow-discharge optical emission spectroscopy

(GDOES). The wear tests were performed with an oscillating ball-on-disc tribometer.

It was found, that under constant current treatment conditions, the PSA layer survived the applied voltage of 350 V, whilst 400 V resulted in an intermediate stage; and under 450 V, the PSA layer was fully converted to PEO already after 5 min of the PEO treatment. A comparison with PEO formation on the bare material revealed that during the “sparking” mode (400 V) of PEO formation, the PEO coatings, formed on PSA treated AA2024, were more wear resistant in comparison with the same PEO coatings on bare AA2024.

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ЭЛЕКТРОСИНТЕЗ ТОНКИХ ПЛЕНОК НИКЕЛЯ С МОЛИБДЕНОМ

Сплавы на основе Ni наиболее используемые катоды для электролиза щелочных вод благодаря относительно высокой каталитической активности Ni и синергизма в каталитическом поведении различных компонентов в металлическом сплаве. Сплавы никеля с молибденом были синтезированы различными методами [1-4].

Материалы на основе никеля и молибдена привлекают все больше внимания благодаря их активности для HER и достаточной коррозионной стойкости в щелочных растворах при незначительной стоимости [1,5]. Синтез новых наноструктурных материалов очень важен для применения их в области водородной энергетики. Метод электрохимического осаждения позволяет получить новые наноразмерные структуры с заранее заданными свойствами. Электроосаждение является рентабельным, удобным и интенсивным методом получения нанофазных и нанокристаллических материалов с превосходной степенью воспроизводимости, состав которых легко регулируется изменением концентрации компонентов в электролите и условий электролиза [6,7].