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PROCEEDINGS

Electrodeposition of high entropy FeCoCrNiMn coating on SAE 1020

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High entropy alloys (HEA) represent a relatively new class of metallic materials. They are composed of multiple components, without a predominance of elements, in an equiatomic form of five or more elements, with atomic concentrations between 5 and 35%. They present a distorted crystal structure and a combination of characteristics that affect their structure and functionality. These alloys exhibit excellent mechanical properties, such as high strength, hardness, wear and compression resistance, and chemical properties, including corrosion resistance. From the point of view of practical engineering applications, the and cost of components manufactured with HEA and produced by conventional casting methods are still considered a barrier. In this sense, coatings based on high entropy alloys have been gaining prominence in the scientific scenario to improve surface characteristics of conventional metallic alloys in a variety of applications, as resistance to corrosion and wear, when applied to low-cost metallic substrates, such as carbon steels and aluminum alloys. The electrodeposition process is considered advantageous in relation to the cost of equipment necessary for its execution and a more precise adjustment of the deposition conditions. In this study FeCoCrNiMn HEA coatings were electrodeposited on SAE 1020 steel. Process parameters as concentration of elements in the electrolyte, current-voltage values and process time of 15 and 30 minutes as well as substrate surface finish, were evaluated. The coatings obtained were characterized by X-ray diffraction, scanning electron microscopy and spectroscopy of dispersive energy. The electrochemical behavior in a 3.5 wt% NaCl aqueous solution was evaluated by the techniques of impedance spectroscopy and linear polarization. The results show the formation of a homogeneous coating on the steel surface and good corrosion resistance.