

Deposition and Properties of PEO Coatings on Zinc-Aluminum Alloys

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Abstract : Zinc-aluminum alloys have been applied as alternatives to bronze, aluminum alloys, and cast iron due to their distinguishing features such as high as-cast strength, excellent bearing properties, as well as low energy requirements for melting. In this study, oxide coatings were produced on ZA27 zinc-aluminum alloy by a plasma electrolytic oxidation (PEO) method. Three coatings were deposited by using three various electrolytes, i.e. silicate, aluminate and aluminate/borate composite solutions. The current density is set at 0.1A/cm², deposition time is 40 mins for all the deposition processes. The surface morphology and phase structure of the three coatings were characterized by scanning electron microscopy [SEM] and X-ray diffraction (XRD). Pin-on-disc sliding wear tests were conducted to test the tribological properties of coatings. The results indicated that the coating produced using the aluminate/borate composite electrolyte had the highest deposition rate and best wear resistance among the three coatings.

Keywords : oxide coating, PEO, tribological properties, ZA27

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