



ME Seminar



Evolution of plasma electrolytic oxidation coatings formed over Mg alloy utilizing various alkaline electrolytes and their corrosion behaviour

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ABSTRACT

The plasma electrolytic oxidation (PEO) process is an electrochemical-based surface engineering technique utilized mainly for valve metals like aluminum (Al), titanium (Ti), magnesium (Mg), zirconium (Zr), etc. PEO coatings offer protection against the wear and corrosion of metallic materials as it consists of hard and dielectric complex oxides. Mg and its alloy despite having various engineering and technological importance properties such as high specific strength, biocompatibility, electromagnetic shielding, etc. its widespread application is severely restricted by its intrinsic poor corrosion performance. PEO processing is one of the effective strategies used for improving the corrosion resistance of Mg-based materials in both academic research and the industrial/commercial field. This talk discusses the evolution and corrosion behavior of the Plasma Electrolytic Oxidation (PEO) coatings synthesized over Mg alloy utilizing the silicate-based, phosphate-based, and mixed silicate-phosphate-based alkaline electrolytes, with and without glycerol additive. For this the voltage-time characteristics, coatings' morphology (top surface), porosity, thickness, elemental and phase composition, electrochemical impedance spectroscopy, and potentiodynamic polarization were studied comprehensively and comparatively as a function of PEO processing time.

ABOUT THE SPEAKER

Dr. Ashutosh Jangde completed his Bachelor of Engineering (2007) from the Department of Metallurgy, National Institute of Technology, Raipur (Formerly Government Engineering College). Subsequently, he completed his Master of Engineering (2009) and Doctor of Philosophy (2021) from the Department of Materials Engineering, Indian Institute of Science, Bangalore. He has also worked at the Central Power Research Institute, Bangalore as a Senior Research Fellow and in Rail Wheel Factory, Indian Railway, Bangalore as a Chemical and Metallurgical Assistant.



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