ME Seminar

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

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ABSTRACT

Magnesium 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 properties. Plasma Electrolytic Oxidation (PEO) processing is one of the effective and environment-friendly strategies used for improving the corrosion resistance of Mg-based materials and the same has been used both in academia and the industrial/commercial field. PEO process is an electrochemical-based surface engineering technique utilized conventionally 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. This talk discusses the evolution and corrosion behavior of the 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 (cross-section), 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 is currently a postdoctoral research associate at the Department of Materials Science and Engineering (Professor Beverley J Inksons Group), University of Sheffield, UK. Before this, he was a postdoctoral research associate at the Department of Material Engineering (Professor Kamanio Chattopadhyays Group), Indian Institute of Science, Bangalore, India. He completed his Ph.D. in 2021, (Professor Subodh Kumars Group) and Master of Engineering in 2009, (Professor M.K. Surappas Group) from the Department of Materials Engineering, Indian Institute of Science, Bangalore. He completed his Bachelor of Engineering (2007) from the Department of Metallurgy, National Institute of Technology, Raipur (formerly Government Engineering College). He has also worked at the Central Power Research Institute, Bangalore, as a senior research fellow and at the Rail Wheel Factory, Indian Railway, Bangalore as a chemical and metallurgical assistant.

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