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TMS 2026

155th Annual Meeting & Exhibition

March 15–19, 2026
San Diego Convention Center
and Hilton San Diego Bayfront
San Diego, California, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ADVANCED CHARACTERIZATION METHODS

Cutting-Edge Characterization and Electrochemical Techniques for Unraveling Corrosion Phenomena

This symposium will focus on advanced characterization and electrochemical techniques that provide deeper insights into corrosion mechanisms, degradation processes, and protection strategies for metallic materials. A comprehensive understanding of corrosion behavior is critical for predicting service lifetimes, improving material performance, and developing corrosion-resistant alloys and coatings. Despite extensive research on corrosion phenomena, there remains a need to bridge the gap between material behavior and electrochemical analysis, where characterization techniques provide correlative evidence to support corrosion studies. This symposium will bring together researchers and industry professionals to discuss the latest experimental advancements in corrosion science.

Topics of interest studied using advanced in-situ and ex-situ characterization (such as TEM, APT, XPS, SIMS, XCT, AFM, SEM, and more) and electrochemical techniques (such as SVET, SECCM, EIS, and more) include but are not limited to:

- The role of localized corrosion, including pitting and intergranular attack, in initiating material degradation
- Strategies for mitigating corrosion through inhibitors that enhance passivation and surface stability
- Fundamental studies on the initiation of dissolution, corrosion kinetics, and electrochemical impedance behavior
- The impact of microstructural and nano structural modifications on corrosion resistance and material durability
- Utilization of advanced characterization to understand the transition of corrosion to stress corrosion cracking and/or corrosion fatigue and crack initiation processes
- Interactions between electrochemical properties and mechanical performance, particularly their deterioration due to corrosion
- Novel approaches to designing corrosion-resistant materials, including high-entropy alloys, additive manufacturing techniques, and unconventional microstructures
- Protective surface engineering methods, such as advanced coatings and hardening treatments, to enhance durability in extreme environments

SPONSORED BY:
TMS Structural Materials Division; TMS Corrosion and Environmental Effects Committee

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