

THE WORLD COMES HERE.
TMS 2025
154th Annual Meeting & Exhibition



March 23–27, 2025
MGM Grand Las Vegas
Hotel & Casino
Las Vegas, Nevada, USA
#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2025 SYMPOSIUM:

MECHANICS OF MATERIALS

Solid-State Diffusion Bonding of Metals and Alloys

Solid state diffusion bonding is a welding process that is based on the atomic diffusion across the mating surfaces to produce monolithic parts with comparable mechanical properties to those of bulk material. It is often performed at high pressures and temperatures to promote the interdiffusion process. The technique is widely used in nuclear, aerospace, petrochemical, and solar energy applications and used to join both similar and dissimilar materials and alloys. Nevertheless, the bonding process is highly sensitive to several factors, such as surface finish, temperature, pressure, and time. In some cases, low-melting interlayer is needed to promote the interdiffusion process. Bonding time is always a major factor in the process; while increasing time allows atomic diffusion to occur, it led to the precipitation of second phase particles in the matrix and grain boundaries.

This symposium will focus on recent progress in the diffusion bonding processes performed in research environments, as well as on industrial scales, with special focus on:

- Optimal bonding conditions for metals and alloys.
- Changes in the mechanical properties in the bonded joints.
- Grain growth and microstructural evolution after the bonding process.
- Precipitation in complex alloys.
- Modeling and simulation of the diffusion bonding process.

ORGANIZERS

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