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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:

ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution

This annual symposium is to honor the memory of a great pioneer in alloy thermodynamics and microstructures, William Hume-Rothery. According to Hume-Rothery, the stability of alloy phases and microstructures is critically dependent on the atomic sizes, the valency electron density, and electrochemical differences among the constituent atoms, described in a set of Hume-Rothery rules. These textbook Hume-Rothery rules have been very useful in providing guidelines for designing phase stability and microstructures not only of metallic alloys but also of ceramic and semiconductor alloys. The effects of atomic sizes, valence electron density, and electronegativity of atoms can be translated into the mechanical and chemical contributions to the thermodynamics of phases and microstructures. This invitation-only symposium will feature the 2025 TMS William Hume-Rothery awardee as an honored presenter and bring together experts in theory, computation, and experiments to discuss recent advances in understanding, predicting, and designing thermodynamic stability evolution of phases and microstructures in materials.

Topics of interest include, but are not limited to:

- General theory and computational methodology developments for understanding and predicting the stability and evolution of phases and their microstructures
- Effect of atomic size mismatch on the thermodynamic stability of single and multiphase systems
- Strain/stress effect on phase and domain structure stability of bulk crystals and thin films
- Temperature-strain and temperature-strain-composition phase equilibria and phase diagrams
- Coherent versus incoherent phase equilibria, phase diagrams, and microstructures
- Phase and microstructure stability under external fields such as stress, electric, or magnetic fields

ORGANIZERS

Yunzhi Wang, Ohio State University**; Wei Xiong,** University of Pittsburgh**; Jiamian Hu,** University of Wisconsin Madison**; Chuan Zhang,** CompuTherm LLC

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