ASM INTERNATIONAL

Milwaukee Chapter

UPCOMING PRESENTATION

LOCATION :
Thunder Bay Grille
N14W24130 Tower Place
Pewaukee, WI 53072

TUESDAY, NOVEMBER 14 2023

TIME
5:30 - SOCIAL
6:00 - DINNER
7:00 - PROGRAM

COST
$ 30 - MEMBER
$ 35 - NONMEMBER
$ 15 - LIFE MEMBER
FREE - STUDENT/MEMBER BETWEEN JOBS*
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ABSTRACT

High Temperature Alloy Design Strategies

The challenges of a high temperature environment (T>1400°C) impose severe material performance constraints in terms of melting point, oxidation resistance and structural functionality. A number of ceramic materials, intermetallic compounds and refractory metals with high melting temperature are available as material choices. However, in a single component, single-phase form, these materials do not satisfy all the above requirements. One clear message from the evolutionary development of high temperature alloys is the importance of developing multicomponent alloys with multiphase microstructures and the capability to control phase fractions and morphologies to satisfy the mechanical property requirements. Besides the essential structural requirements, elevated temperatures also often involve aggressive environments that require a material to display an inherent oxidation protection that can be enhanced further by coating.

Among the leading candidates to advance beyond the capability of current Ni base superalloys, the multiphase microstructures that can be developed in refractory metal alloys have attracted much attention. For example, alloys in the Mo-Si-B system involving the high melting temperature (>2100°C) ternary-based intermetallic Mo5SiB2 (T2) offer an attractive performance. Most of the attention has been on three phase alloys comprised of Mo(ss), T2 and Mo3Si that offer high temperature stability and robust microstructures, but new alloy designs are in development. In this presentation the recent advances in the development of Mo-silicide alloys are discussed in terms of alloy design and synthesis, microstructure control, structural performance, environmental resistance and component analysis.

PRESENTERS:

John Perepezko
UW-Madison

Professor John H. Perepezko is the IBM-Bascom Professor of Materials Science and Engineering at the University of Wisconsin-Madison. His honors and awards include the ASM Bradley Stoughton Award, Fellow of ASM , the Alexander von Humboldt Stiftung Forschungspreise, the TMS Bruce Chalmers Award, TMS Fellow, National Academy of Engineering, JSPS Fellow, AAAS Fellow, TMS W. Hume-Rothery Award, MRS Fellow, Adjunct Professor - Tohoku University and the Tokyo Institute of Technology and the Helmholtz Gemeinschaft International Fellow Award. His research interests include transformation behavior and microstructure/property relationships during materials processing and solidification, metallic glass, intermetallic alloys, coatings, phase stability, modeling and materials design.

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