

Symposium O: Structure-Properties Relationship of Advanced Metallic Materials

Scope of the symposium

Over the last decades, we have witnessed and benefited from the development of numerous new technological systems. The development of these technologies emphasizes the importance of materials as the primary building blocks for engineering developments. On the one hand, the properties of materials have dictated nearly every design and every useful application that the engineer could devise. On the other hand, with the present sophistication of science and engineering of materials, it is no longer simply a question of being satisfied to design with existing materials. We are now requiring new materials with new properties to fit our designs. This is true in all fields of engineering. This search for new materials with improved properties now occupies an important position in the engineering world.

A number of procedures have been recently proposed to aid the development of materials science and engineering. For example, the advents of the scanning tunneling microscope and the atomic force microscope, together with developments in electron microscopy, have opened new ways for the study of structure materials at the nano-scale. Advances in the field of fracture mechanics and its application to structural design and material selection have helped to offset some of the potential dangers posed by increasing technological complexity, and have undoubtedly prevented a substantial number of structural failures. The development of thermo-mechanical processing in steel industry changed the traditional concept of deformation processing, when the single operation to reduce thickness and to provide a desirable shape has been improved to product specific microstructures, with which are associated particular mechanical and physical properties. This Symposium deals with these topics, to show some of the new most important scientific and technological advances in materials science and engineering.

The objective of this Symposium is to discuss the relationships between processing, structure, properties and performance of advanced engineering metallic materials, with emphasis in new fabrication and characterization techniques.

Abstracts will be solicited in (but not limited to) the following topics:

- Techniques for microstructure and properties characterization.
- Fracture mechanics applied to structural integrity.
- Light alloys (Al, Mg, Ti) for automotive and aeronautical applications.
- Recent developments in steels for automotive industry and for gas/oil pipelines.
- Materials to resist creep.

Symposium Organizers

Leonardo Barbosa Godefroid (Escola de Minas - UFOP, Ouro Preto, MG, Brazil)

Waldek Wladimir Bose Filho (USP - Sao Carlos, SP, Brazil)

Luiz Carlos Rolim Lopes (Universidade Federal Fluminense, Volta Redonda, RJ, Brazil)

Juan Perez Ipiña (Universidad Nacional del Comahue, Buenos Aires, Argentina)

Pedro Dolabella Portella (Federal Institute for Materials Research and Testing, Berlin, Germany)

Invited speakers (tentative list)

Robert O. Ritchie (Univ. California-Berkeley – USA), **A.K. Vasudevan** (Office of Naval Research – USA), **J.C. Newman Jr.** (Mississippi State University – USA), **Subra Suresh** (MIT – USA), **Robert H. Dodds** (University of Illinois – USA), **David Matlock** (Colorado School of Mines – USA), **Robert Wagoner** (Ohio State University – USA), **John David Embury** (McMaster University – Canada), **R.J.H. Wanhill** (Nat. Aerospace Lab. - The Netherlands), **François Mudry** (ArcelorMittal – France), **André Pineau** (ENSMP – France), **Harry Bhadeshia** (University of Cambridge – UK), **K.H. Schwalbe** (Consultor – Germany) **K. Wallin** (VTT – Finland), **Andrea Carpinteri** (University of Parma – Italy)

Scientific committee members (tentative list)

André P. Tschiptschin (EPUSP - São Paulo)
Claudio Ruggieri (USP - São Carlos)
Luiz Paulo M. Brandão (IME - Rio de Janeiro)
Jayme T.P. de Castro (PUC - Rio de Janeiro)
Fathi A. Darwish (UFF – Niterói)
Paulo Rangel Rios (UFF - Volta Redonda)
Dagoberto Brandão (UFMG - Belo Horizonte)
Paulo Modenesi (UFMG - Belo Horizonte)
Ronaldo Barbosa (UFMG - Belo Horizonte)
Margareth Spangler de Andrade (CETEC – Belo Horizonte)
Túlio Magno Füzessy de Melo (USIMINAS – Ipatinga)
Willy Ank de Moraes (USIMINAS – Cubatão)
Ricardo A. Faria (APERAM – Timóteo)
Charles Martins (ARCELORMITTAL – Tubarão)
Vicente Braz Trindade (Vallourec & Sumitomo – Jeceaba)