

## APDIC World Round Robin Seminar

Rio de Janeiro, July 24, 2006

The second APDIC World Round Robin Seminar (WRRS) was held in Rio de Janeiro on July 24, 2006 as part of the 61st Annual Congress of Associação Brasileira de Metalurgia e Materiais (ABM), the Brazilian association for metallurgy and materials, a 60-year-old organization that has more than 3000 individual and 100 corporate members.

### APDIC

APDIC, the Alloy Phase Diagram International Commission, was established in 1986 in Orlando, FL, as an organization to promote the assessment of phase diagrams. Originally consisting of ten member organizations, the commission has grown to include 17 member organizations representing 22 countries from North and South America, Europe, and Asia. As part of the International Programme, approximately 70 volumes on binary and ternary alloy systems totaling some 50,000 pages have been published under the auspices of APDIC.

APDIC has moved with the times and has developed into a group of organizations and individuals working together to exchange information, minimize duplication of effort, provide top-quality databases and phase diagram information, and promote the generation, developing, and sharing of information on the understanding of the equilibrium state of material systems, using the most advanced techniques available. As part of its regular activities to that objective, APDIC presents an annual Best Paper Award and an Industrial Award and co-organizes, every two years, a World Round Robin Seminar dedicated to the dissemination of knowledge on the most advanced tools for understanding and applying information on phase equilibrium in materials.

### WRRS

Although the numerous binary and ternary phase diagrams assessed and

edited by APDIC members still play a key role in the development of materials technology communities, APDIC felt, some years ago, the necessity of exploring a new direction of activities.

Besides phase diagram data, APDIC has valuable human resources who are expert in assessing, calculating, and determining phase diagrams using a variety of modern tools. Thus, APDIC decided to offer a series of educational seminars on phase diagrams to industry practitioners, researchers, and students. This is the basic idea of the World Round Robin Seminar (WRRS).

The lecturers, either selected among APDIC members or invited by APDIC, are all well-known experts in the field, and they provide a systematic knowledge of phase diagrams starting from the fundamentals to up-to-date application in material design, processing, and usage. These Seminars are primarily educational for researchers in industry and students and are complementary to the "User Aspects of Phase Diagrams" meetings organized, for example, by ASM International. The features of the WRRS have been described in JPED 2004 25(2), p 111 by former APDIC chair Professor Tetsuo Mohri.

The WRRS is held every two to four years. The first WRRS was held in Sapporo, Japan, in 2002 in collaboration with the Japanese Committee for Alloy Phase Diagrams. The second WRRS was held in Rio de Janeiro in 2006.

### The Second WRRS in Rio de Janeiro, 2006

The second WRRS was promoted by APDIC in collaboration with ABM, the supporting organization of the Brazilian Committee for Phase Diagrams of Materials, and took place during ABM's Annual Congress. The Congress is one of the largest metals and materials related events in Latin America, hosting more than 600 participants from more than 100 organizations. There were 470 papers presented during the Congress, held in Rio de Janeiro, July 24 to 27, 2006. The congress also included a one-day session on July 25 dedicated to phase diagram research.

The WRRS was held on July 24, the first day of the Congress, with 34 registered participants, 22 of which were from various industry segments, with a concentration on the steel industry. The Seminar focused on the "Application of Phase Diagrams to the Design, Devel-



Participants were university professors, industry professionals, and graduate students.



**Prof. Ted Massalski presented the first lecture of the WRRS.**

opment, and Processing of Metallic Materials.” There were eight lectures of 1 h each. The lecturers and topics were:

- **Thaddeus B. Massalski**, Professor, Carnegie Mellon University. Phase diagrams and applications
- **Robert DeHoff**, Professor Emeritus, University of Florida. The relationship between phase diagrams and thermodynamics
- **Ake H. Janson**, Researcher, TCAB, Sweden. Introduction to computational thermodynamics and its relations to phase diagrams—by example
- **Tetsuo Mohri**, Professor, Hokkaido University, Japan, Former APDIC Chairman. First-principles calculation—from phase diagram to microstructure
- **Rainer Schmid-Fetzer**, Professor, Clausthal University of Technology, Germany, APDIC Chairman. Applications of phase diagrams and thermodynamics to alloy processing and the importance of databases
- **Tooru Matsumiya**, Fellow, Nippon Steel Corporation, Japan. Application of computational thermodynamics in steelmaking process
- **Fernando Cosme Rizzo Assunção**, Professor, PUC-Rio, Brazil. Phase diagrams and thermodynamics in the design of advanced steels
- **André Costa e Silva**, Professor, EEIMVR-UFF, Brazil, APDIC Vice-Chairman. Applications of phase diagrams and thermodynamics in steel processing

Four of the lectures were focused on building up and reviewing the essen-



**Dr. Tooru Matsumiya of Nippon Steel Corporation presented examples of applications in the steel industry.**

tial knowledge of the classical and advanced tools required for analyzing and using phase equilibrium information profitably. The integration of phase diagrams with computational thermodynamics as well as with first-principles calculations was emphasized and examples were presented that demonstrated the potential of these techniques. In the afternoon, the lectures were focused on applications,

with a strong bias toward steels and steelmaking.

As the complexity of materials increase, phase diagram and related phase equilibrium information techniques gain importance as essential tools in materials design, development, and processing. The developments in the area in the last decades have made it possible to achieve dramatic savings in experimental programs as well as in process development through the application of these modern tools. APDIC feels that by offering WRRSs and disseminating the most up-to-date information, it is playing a vital role in promoting development in the materials area, as well as complementing education and supporting research in its member countries.

For further information on APDIC, see JPE, 2003, **24(5)** p 389 and on APDIC Awards, JPED, 2005, **26(5)** p 408, and the APDIC website at <http://www.matport.com/communities/apdic/index.shtml>.

**André Costa e Silva**  
Vice-Chairman, APDIC  
**Tetsuo Mohri**  
APDIC-WRRS Committee Chairman



**WRRS participants enjoy a break during lunch time. In the background is the Pedra da Gávea, in São Conrado beach, Rio de Janeiro.**