

The French Committee of Phase Diagrams France

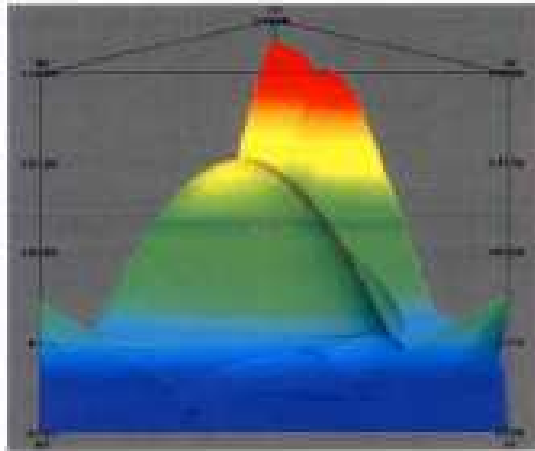
Report to APDIC, June 2008 by Jean-Claude Tedenac
Saariselkä Finland

Phase diagrams activities during the last year:

- **High temperature materials seminar (November 2007)**
- **Journées d'étude des équilibres entre phases (March 2008)**
- **Increasing the Knowledge of Phase diagrams : a tool – Diagplot**
- **Workshop: Phase diagrams, Knowledge and industrial applications**



I Diagplot a tool for learning phase diagrams



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THERMODATA
6 rue du tour de l'eau
Saint Martin d'Hères FR: 38400

<http://www.thermodata.org>

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I Diagplot



DiagPlot

Phase Equilibria Diagrams

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In physical chemistry, mineralogy or materials science, a phase diagram is a type of graph used to show the equilibrium conditions between the thermodynamically-distinct phases.

Phase Equilibria diagrams are one of the single most useful tools of a materials scientist and engineer. As maps of the temperature ranges and solubility limits of each known phase in the alloy system, including compounds, they are obviously useful to metal casters, heat treaters, ceramicists ... etc., and are an invaluable tool in alloy design, in the development of high-temperature superconductors and in investigations of practically any temperature dependent property.

DiagPlot is a software developed with the support of ARCELOR, CNRS, EDF R&D, INPG and designed for engineers and students to easily plot phase equilibria diagrams for binary and ternary systems, 2D & 3D.



2 Workshop: Phase diagrams, Knowledge and industrial applications

TECHNICS AND METHODS OF STUDIES OF PHASE DIGRAMS

Lecture 1 : «Experimental methods of determinations of thermodynamic properties and phases diagrams.»

Jacques ROGEZ, Université Paul Cézanne, Faculté des Sciences et Techniques Saint Jérôme, Marseille – France.

Lecture 2 : «Methods used in ternary diagrams determination»

Bernard LEGENDRE, Université de Paris, Paris - France.

THERMODYNAMICS AND PHASE DIAGRAMS

Lecture 3 : «Thermodynamics and phase diagrams in electronic matériaux»

Jean Claude TEDENAC, Université Montpellier II, Montpellier – France.

APPLICATIONS OF PHASE DIAGRAMS

Lecture 4 : «Phase Transferts : Applications to clean processes»

Ahmed SOUISSI, Ecole Mohammedia des Ingénieurs, Rabat– Maroc.

Lecture 5 : «Phase equilibria applied to some industrial processes»

Abderrahman ARAFAN, Ingénieur, Chef de Division, Groupe Office Chérifien des Phosphates «OCP», Youssoufia - Maroc.



3 Journées d'étude des équilibres entre phases

Communications related to alloys and inorganic materials: 25

Lectures	3
Oral communications	10
Posters	12



Alan Prince book



4 High temperature materials seminar Marseille

Tuesday 4 and Wednesday, December 5, 2007 in Marseilles (St. Jerome)

40 thermodynamiciens working on mineral phases at high temperatures met for the fourth time specific experiments within the thermodynamic modeling and optimization

The themes of the 2007 seminar were :

1 - know-how for youngest scientists

a / Experimental: presentation of the measurement methods we used.


b / Theory: An attempted summary of thermodynamic models available. What models for which chemical systems?

2 - free themes: Around the current concerns, discussions, sharing and exchanging experiences. Are all themes emerged current materials, including nanomaterials and materials under constraints.

Collective decisions taken in 2008

-- The seminars are appreciated by all in terms of discussions not only scientists but also methodological (difficulties experimental research strategies, mutual...). C. Chatillon proposes to organize the seminar in Grenoble 2008 - St Martin d'Hères maintaining the same original spirit.

-- After the presentation by Y. The Godec of network operations CNRS-High Pressure, decision is taken gradually to formalize the existence of our group following a similar pattern. At first the list of participants in this network, established in 2002, is to update



What else?

World Round Robin Seminar ? September 2009, second week,

POSSIBLE TOPICS:

- Calphad and ab initio
 - Development of thermodynamic and kinetic databases of practical materials.
Lying
 - Bulk modulus, elastic constants, thermal expansion: Connection to Gibbs energy modelling.
 - Low-dimensional systems (Surfaces and Interfaces) and applications
 - Thermodynamics of nanomaterials in a Calphad approach
 - High temperature Materials and extreme high temperature Materials (superalloys with Pt and Rare earth)
 - Materials for energy and sustainable development
 - Microstructure and failures of materials (alloys and ceramics)
 - Equilibrium with gas phase: corrosion studies
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