Carnegie Mellon
Materials Science and Engineering Seminar Series
Materials Research at Carnegie Mellon

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"Phase Diagrams: Yesterday, Today and Tomorrow"

Friday, January 30, 2009
11:30 A.M. Seminar in Baker Hall 136A

In my presentation, I will discuss the world-wide interests in phase diagrams, and the activity in this field both in the past and at present. I will then discuss some novel experimental approaches for determining phase diagrams, and opportunities to use phase diagrams for discovering glass formation, structural changes during phase transformations, and the planning of heat treatments. I will then review the problems encountered at low temperatures, particularly below room temperature and review problems and literature pointing out how to detect phase diagram errors. The remaining time will be devoted to the use of phase diagrams in the nuclear energy field and what phase diagram representations can be developed for nano systems. In this presentation I will not discuss modeling approaches to phase diagrams at such as CALPHAD, or FactSage thermo-chemical software and data bases.

Nearly the entire career of Prof. Massalski has been connected with his interest in alloy phase stability, phase transformations and phase diagrams. Many years ago, he organized and carried out (as Editor in Chief) the NIST/ASM program on Binary Phase Diagram Evaluations. Prof. Massalski is also the founding member of the Alloy Phase Diagram International Commission (APDIC). The final result of this activity over several years was the publication of the well-familiar three volumes of updated Binary Phase Diagrams. In his research career Prof. Massalski discovered and pioneered research on "Massive Transformations" and last year was the 50th anniversary of his seminal paper published on this topic in Acta Materialia. In addition, he published over 200 papers on Hume-Rothery Alloys, Phase Transformations, Thermodynamics, Phase Diagrams, Amorphous Materials, Magnetic Materials, Actinide Elements and many other topics. He has also delivered over 300 invited lectures and presentations. Prof. Massalski is a member of three Foreign Academies and has been elected Fellow of numerous societies. He is the holder of three gold medals and numerous awards both in the USA and abroad. In his early career, he has co-authored (with Prof. C.S. Barrett) the third edition of "Structure of Metals" which has been translated into 8 foreign languages. Currently, Prof. Massalski acts as Editor, or Co-Editor, of Progress in Materials Science (impact factor >20), Metallurgical Transations, and is a member of a number of Editorial Boards. He is also author and co-author of numerous books, chapters, symposia and workshops.