Foreword

Hume-Rothery Symposium on Thermodynamics and Diffusion Coupling in Alloys—Application Driven Science

A symposium honoring Prof. John Ågren, the recipient of the William Hume-Rothery Award, was held at the 140th TMS Annual Meeting and Exhibition in San Diego, CA. This award recognizes exceptional scholarly contributions to the science of alloys. Some presentations given at the symposium were written as papers and published in this collection.

John Ågren was a Ph.D. student of Mats Hillert at the Royal Institute of Technology, Stockholm, Sweden. Upon finishing his Ph.D. work, he came to ManLabs, where Dr. Larry Kaufman had been a Research Scientist, Director of Research, Vice President, and President.

John has made several significant contributions to alloy theories, including both thermodynamics and kinetics of alloys. His research covers a large field of different topics, ranging from fundamental physics like thermodynamics to technological problems like processing and heat treatment of multicomponent alloys, steels, and hard metals. His vision was to use fundamental thermodynamics as a tool for understanding microstructural evolution and kinetics. Together with co-workers at the Royal Institute of Technology (KTH) in Stockholm, he developed a general sublattice model for the thermodynamic description of multicomponent phases and later expanded it to include ionic species. He extended the multicomponent diffusion theory that allowed the use of the CALPHAD method for developing diffusion mobility databases to facilitate efficient calculation of multicomponent diffusion coefficients. In recent years, John has expanded his research employing phase field simulations that use the CALPHAD descriptions of the thermodynamics as well as of the diffusion mobilities.

It should be emphasized that it is not too uncommon for a scientist to make significant contributions to one of the areas, either thermodynamics or kinetics, but it is rare in both areas. Furthermore, taking the theories and developing computational tools for scientific communities to use those theories and solve theoretical and practical challenges is what distinguishes John from the others.

We wish John continued contributions to the science of alloys.

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