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Guest Editorial

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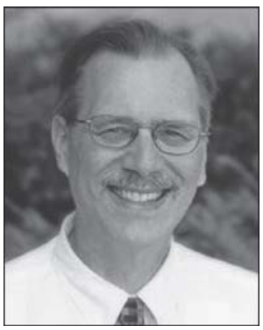

John E. Morral

Richard D. Sisson, Jr.

The papers in this edition of JPED were presented at the symposium entitled "Multicomponent-Multiphase Diffusion" that was held during the TMS 135th Annual Meeting and Exhibition (San Antonio, TX, March, 2006). This symposium was held in honor of Professor Mysore A. Dayananda of Purdue University. The symposium highlighted the many outstanding contributions of Professor Dayananda to research and education in materials science and engineering, with an emphasis on his important, groundbreaking work on multicomponent-multiphase diffusion. Over the past 40 years, Professor Dayananda's research on multicomponent systems has included both theoretical and experimental studies of intrinsic diffusion and interdiffusion. His work includes ternary and quaternary metallic alloys, intermetallic phases, and silicides, as well as investigations of diffusion paths in multiphase systems, interface stability, and microstructural evolution. In 1979, Professor Dayananda was the first to identify and explain the phenomenon of zero-flux planes (ZFP) where the interdiffusion flux of a component goes to zero within the diffusion zone. He showed that they could form in ternary or higher-order diffusion couples and were normally associated with a flux reversal.

Considering the success of the 2005 TMS symposium with a similar technical emphasis that was held in honor of Professor John E. Morral of Ohio State University, this event continues to demonstrate the importance and vitality of understanding multicomponent-multiphase diffusion. In 2006, more than 50 research projects were presented and highlighted by scientists and engineers from all over the globe, including Canada, Sweden, Czech Republic, Poland, Australia, Germany, France, Japan, Korea, China, Taiwan, Portugal, and the United States. The outstanding quality of the presentations and the excellent attendance at the sessions demonstrate the importance of multicomponent-multiphase diffusion to a wide variety of theoretical issues, as well as many important industrial applications. An improved understanding of these diffusional phenomena is necessary for the control of many high-temperature degradations, coatings, and manufacturing processes related to the aerospace, automotive, marine, microelectronic, and petrochemical industries. In future symposia, we hope to continue the success of these events with more sessions and symposia that address both the theoretical and practical applications of an enhanced understanding of multicomponent-multiphase diffusion.

We thank Professor Dayananda for his untiring dedication as a Professor who contributed so much to the knowledge of multicomponent-multiphase diffusion and served as a mentor to many students and faculty alike. We also look forward to future symposia on diffusion with significant scientific progress and excellent fellowship.

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