

Professor Toshihiko Emi—Seeing is Believing

Professor Emi has contributed to the science and technology of steelmaking and casting for over 50 years. His scientific contributions have ranged from the very basic fundamentals to direct innovations in industry. He has published over 250 papers, won best paper awards from virtually every society in the world. He has served on the editorial board of major metallurgical journals and he holds numerous honorary appointments in Europe, North America and Asia. His scientific impact is known to eminent academics all over the world, students pursuing process metallurgy as well as plant managers and engineers. It is hard to *believe*, without *seeing* that such a perfect metallurgists can exist.

He received his undergraduate degree from Osaka University under the supervision of Prof. Zen Ichiro Morita, and then started his professional career at Kawasaki Steel (currently part of JFE Steel) as a researcher in 1958; but proceeded to become the Chief of the Ironmaking, Steelmaking, Casting and Refractory Labs in the R&D Division. During his time at Kawasaki Steel, he took a leave for 2 years to get his Ph.D. at Hokkaido University under the supervision of Prof. M. Shimoji. His held research appointments with eminent world leading scientists in USA, for example, Prof. J.O.M. Bockris at The University of Pennsylvania (in the area of Fused Salts and Fuel Cells) and Prof. R.D. Pehlke at The University of Michigan (in the area of gas-metal reaction kinetics) to name a few.

In 1993, he became a faculty at Tohoku University. Here, he pioneered the development and use of high-temperature laser confocal microscope, a powerful experimental tool which enabled process metallurgists to directly image reactions and transformations under steelmaking and casting conditions. In many ways this revolutionized the way in which we viewed metallurgical reactions since the micro-structural changes caused by thermal or chemical changes could be directly visualized, rather than by indirectly deduced from post mortem analysis.

This symposium entitled Challenges and Transformative Solutions to Sustainable Steelmaking and Casting -For Environmental-Friendly Metallurgical Innovation (commonly known simply as the “Emi Symposium”) was held September 3-4, 2015 at Tokyo in the campus of The University of Tokyo. Prominent scientists from all over the world presented the state-of-the-art research in their fields which range from the science and technology of steelmaking, casting and thermo-mechanical processing. This included fundamental studies on interfacial phenomenon, thermodynamics and diffusion and applied technical breakthroughs in steel processing. This special issue includes selected papers from this symposium from the various topics that were covered.

Among Professor Emi’s many contributions, the ability of observing molten steels and oxides has especially inspired the two organizers of the symposium. It has opened new areas of research where the clustering of inclusions, crystallization of molten oxides, peritectic solidification and breakdown of solid/liquid interfaces can be seen and quantified, rather than being indirectly inferred. Professor Emi has gifted us with the ability to *see* metallurgical reactions, create impact in industrial processes and *believe* that the industry can become sustainable in a green and energy efficient way.



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