



Preface

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Continuous casting is one of the most important innovations in the steel industry due to its high yield, high product quality, energy savings, less pollution, lower cost, as well as better working conditions. Over 96% of crude steel in the world was cast by continuous caster. As a very important functional material, mold flux works as several roles in the continuous casting process. It protects liquid steel from oxidation, insulates it from freezing, and absorbs inclusions, when floating on the top of liquid steel; whereas it lubricates the shell and moderates the heat transfer in the mold, when it infiltrates into the mold/shell channel. Therefore, the quality of final cast product is greatly determined by the performance of mold flux. Improper properties may lead to defects in the bloom, slab or billet, such as severe oscillation marks, cracks, inclusions and slag entrapment, improper solidification structure distribution, and even breakout.

In order to meet the new requirements from the development of advanced steels and green manufacturing, the special issue for Journal of Iron and Steel Research International focused on “Mold Flux: Melt Structure, Properties, Performances”. Nine articles were included in this special issue related to the topics on: (1) Melt structure of silicate, aluminate, etc. based mold flux; (2) Relationship between melt structure and properties of mold flux; (3) Fundamentals of mold flux crystallization; (4) Mechanism of mold flux heat transfer; (5) Interface behavior between molten steel and slag; (6) Thermodynamics and kinetics for the reaction between molten steel and slag; (7) Model between components and performances of mold flux; (8) Development of new type mold flux for advanced steel;

Fluoride-free mold flux; and (9) Mold flux performances and its related casting product quality.



Wan-lin Wang the guest editor of this special issue, is Lotus scholar chair professor and Dean of National Center for International Research of Clean Metallurgy, China. Also, he is the associate dean of the School of Metallurgy and Environment, Central South University. He received his Bachelor Degree of Metallurgical Engineering from Central South University, Master Degree in Metallurgical Engineering from the University of Utah and his Ph.D. in the

Materials Science and Engineering from Carnegie Mellon University in 2007. He worked as a Sr. Research Scientist in the Reckitt Benckiser North America before joining Central South University in 2009. His research focuses on the high temperature processing and continuous casting technology. He is the author of more than 150 publications in the prestigious international journals. Prof. Wang is the recipient of many academic honors, including AIME-Champion H. Mathewson Award from TMS, Marcus A. Grossmann Young Author Award from ASM, Newton Advanced Fellow from Royal Society of UK, Excellent Young Scholar Fellowship from National Science Foundation of China, LMD Energy Best Paper Award—Professional from TMS, Kim + -MMI Best Paper Award from Korean Institute of Metals, Weishoukun Scientific Award, and National Ten-thousand Talents Program Award, etc. He is a distinguished member of the Chinese Society of Metals. He has been invited to be a member of several international advisory boards and give keynote speeches for numerous international conferences, such as International Congress on the Science and Technology of Steel-making, International Conference on Molten Slags, Fluxes and Salts.

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