

Foreword

International Symposium on Defects and Properties of Cast Metals

Defects arising during the casting of liquid metals dramatically affect the mechanical and physical properties of the final product, including primary metals processes and shape casting. Defects form due to a range of mechanisms, such as surface oxidation and entrainment, incorporation of exogenous materials from the containment vessels, dissolved gasses, solidification shrinkage, unwanted micro-structural phases with detrimental morphologies, and the development of stresses in the solidifying metal. The mechanism for the generation of most defects arises from a combination of many physical processes.

The following 12 papers were selected from the International Symposium on Defects and Properties in Cast Metals, held at the 141st TMS Annual Meeting in Orlando, Florida, from March 12 to 15, 2012. They were selected not only for their quality, but to demonstrate the breadth of the conference topics. The six sessions of the three-day symposium were Metal Cleanliness, Porosity, Hot Tearing, Solidification Structure and Segregation, Ductility Creep Stress and Cracks, and finally, Novel processes and their applications. The many issues covered in the 33 conference papers of the TMS proceedings include defect detection, online, sampling and forensic methods; and modeling of phenomena related to defect formation. The casting processes included ingot casting, DC casting, foundry/shape casting, die casting, investment casting, sand-casting, and continuous casting of steel, nonferrous metals, super-alloys, and other materials.

The symposium had contributions from many different alloys systems, including ferrous and non-ferrous alloys, and from primary, secondary and shape casting markets. The research tools employed included mathematical models and experiments in both the laboratory and commercial operation. The goal was to bring together researchers from these different fields who might not usually collaborate and it stimulated significant interdisciplinary discussion.

We would like to thank the invited speakers and all of the participants for their excellent contributions to the success of the symposium. We acknowledge a large number of referees for their timely submission of quality reviews. We thank the Editorial Board of *Metallurgical & Materials Transaction A*, and in particular Prof. David Laughlin and Ms. Dora Moscatello for helping with the review process of the manuscripts. This was the first in what is envisioned to become a series of symposia supported by the Solidification Committee of TMS concerned with casting defects. The next symposium is planned to be held in Orlando, FL during March 2015.

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