# Preface

This conference, the fourth in a series of workshops starting in 2004, had its format expanded to include both cold and hot cracking in welds. This change is reflected in the revised workshop and book title, *Cracking Phenomena in Welds*. Whereas previous workshops concentrated only on elevated temperature cracking (e.g., solidification cracking, liquation cracking, and ductility dip cracking), the new format includes cracking processes that occur at low temperature (e.g., hydrogen cracking, stress corrosion cracking, and stress relief cracking). Past workshop proceedings include the following: *Hot Cracking Phenomena in Welds* (2005, ISBN 3-540-22332-0), *Hot Cracking Phenomena in Welds II* (2008, ISBN 978-3-540-78627-6), and *Hot Cracking Phenomena in Welds III* (2011, ISBN 978-3-642-16863-5). These popular reference books have served as invaluable guides for understanding how and why weld defects form at temperatures near or above the melting point. In total, the three previous books constitute 64 papers with contributions from over 10 countries. It is our hope that the new expanded format will serve to make this and future compendiums even more useful.

The fourth workshop was held in Berlin, Germany, on April 2–4, 2014, and was hosted by the German Federal Institute for Materials Research and Testing (BAM). There were 77 participants and 29 presentations from 15 countries (Germany, USA, France, Sweden, Italy, UK, South Korea, The Netherlands, Canada, Belgium, Austria, Spain, Japan, Ukraine, and Israel). The conference was organized into seven parts: (i) hot cracking—testing, (ii) hot cracking—design, (iii) hot cracking—nonferrous/ferrous, (iv) hot cracking—nickel base, (v) cold cracking, (vi) stress corrosion cracking, and (vii) elevated temperature solid-state cracking. A variety of different cracking subjects were discussed, including test standards, crack prediction, weldability determination, crack mitigation, stress states, numerical modeling, and cracking mechanisms. Likewise, many different alloys were investigated such as aluminum alloys, copper–aluminum dissimilar metal, austenitic stainless steel, nickel base alloys, duplex stainless steel, creep resistant steel, and high-strength steel.

The papers collected here, together with the 64 weld hot cracking papers from previous workshops, constitute a comprehensive source of information on weld defects. The contributing authors are all highly knowledgeable in their own respective fields and have been given the opportunity (without page limitations) to present their results and freely express their opinions. By viewing the four workshop compendiums in series, one can observe how some ideas and approaches to weldability have evolved over time, providing a perspective and appreciation for current thought.

The editors would like to express their gratitude to all of those who participated. We are particularly grateful to the authors who prepared informative manuscripts, sharing with us their valuable knowledge and insight. In addition, we would like to thank BAM for providing an excellent venue for this workshop and, especially, Frau Jeanette Pannicke for organizing this event and helping with the subsequent assimilation of workshop papers. We are also grateful to other organizations affiliated with this event including The Ohio State University (OSU), International Institute of Welding (IIW), and Los Alamos National Laboratory (LANL).

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