



CRC/TRR 270

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Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 08 November 2022, 9:00 s.t., TU Darmstadt, via Zoom



Prof. Mark Easton
RMIT University, Australia

Controlling the microstructure in additive manufacturing processes

Abstract:

One of the biggest challenges in additive manufacturing is controlling the microstructure. The high thermal gradients lead to a propensity to form columnar grains which leads to defect formation and anisotropic properties. The high cooling rates also refine the microstructure which does give other benefits. This talk will initially focus on how understanding of grain size control developed in other solidification technologies can be applied to additive manufacturing. Particular examples of how a combination of inoculant particles, solute content and mechanical treatment can reduce the grain size leading to improved properties will be given. In some alloy systems, particularly Al- and Ni- based alloys hot tearing can also be a problem particularly for higher strength alloys. Again an understanding of hot tearing from conventional solidification processes will be applied to additive manufacturing to show how alloys can be manufactured with lower hot tearing susceptibilities with examples from these systems and how cracking becomes quite complicated in graded alloy structures.

About the speaker:

Professor Mark Easton is currently the Director, Advanced Manufacturing Precinct at RMIT University where he has been since 2014. Prior to this he was at Monash University where he primarily worked with the CAST Co-operative Research Centre and was its final CEO. Mark's PhD is from the University of Queensland and he has also had stints at Comalco (now Rio Tinto Aluminum) Research Centre and at the Leichtmetallkompetenz Zentrum, Rashofen (LKR) in Austria. He is the winner of a number of awards including the Henry Marion Howe Award, the GKSS Magnesium Award and most recently a Mercator Fellowship. Whilst at the CAST CRC he received five commercialization awards for his role in the commercialization of technologies. He has over 20 years experience in solidification processing of light alloys, initially focusing on casting but has more recently focused on additive manufacturing.

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