

Final LIMTECH Colloquium and International Symposium on Liquid Metal Technologies 2017

IOP Conference Series: Materials Science and Engineering
Volume 228

Dresden, Germany
19 - 20 September 2017

Editors:

**Gunter Gerbeth
Robeert Stieglitz**

ISBN: 978-1-5108-4648-7
ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

Volume 228

Final LIMTECH Colloquium and International Symposium on Liquid Metal Technologies

19–20 September 2017, Dresden, Germany

Published online: 3 August 2017

Preface

011001

OPEN ACCESS

[Final LIMTECH Colloquium and International Symposium on Liquid Metal Technologies](#)

011002

OPEN ACCESS

[Peer review statement](#)

Generic Problems and Phenomena

012001

OPEN ACCESS

[Thermo-hydraulic flow in a sudden expansion](#)

W Jaeger, T Schumm, M Niemann, W Hering, R Stieglitz, F Magagnato, B Frohnappel and J Fröhlich.....1

012002

OPEN ACCESS

[Magnetic field dynamos and magnetically triggered flow instabilities](#)

F Stefani, T Albrecht, R Arlt, M Christen, A Gailitis, M Gellert, A Giesecke, O Goepfert, J Hérault, O N Kirillov, G. Mamatsashvili, J Priede, G Rüdiger, M Seilmayer, A Tilgner and T Vogt.....14

012003

OPEN ACCESS

[Magnetically induced instabilities in duct flows](#)

L Bühler, T Arlt, T Boeck, L Braiden, V Chowdhury, D Krasnov, C Mistrangelo, S Molokov and J Priede.....31

012004

OPEN ACCESS

[Instabilities in electrically driven rotating MHD layers](#)

C Mistrangelo and L Bühler.....43

012005

OPEN ACCESS

[Investigations of fluid flow effects on dendritic solidification: Consequences on fragmentation, macrosegregation and the influence of electromagnetic stirring](#)

N Shevchenko, H Neumann-Heyme, C Pickmann, E Schaberger-Zimmermann, G Zimmermann, K Eckert and S Eckert.....53

012006

OPEN ACCESS

[Combined experimental and numerical analysis of a bubbly liquid metal flow](#)

B Krull, E Strumpf, O Keplinger, N Shevchenko, J Fröhlich, S Eckert and G Gerbeth.....69

012007

OPEN ACCESS

[Modelling and simulation of a copper slag cleaning process improved by electromagnetic stirring](#)

H Yang, J Wolters, P Pischke, H Soltner, S Eckert, G Natour and J Fröhlich.....85

012008

OPEN ACCESS

[Using Lorentz forces to control the distribution of bubbles in a vertical tube filled with liquid metal](#)

S Heitkam, S Tschisgale, B Krull, T Wetzels, E Baake and J Fröhlich.....96

012009

OPEN ACCESS

[Validation of X-ray radiography for characterization of gas bubbles in liquid metals](#)

O Keplinger, N Shevchenko and S Eckert.....105

012010

OPEN ACCESS

[Dynamics of liquid metal droplets and jets influenced by a strong axial magnetic field](#)

D Hernández and Ch Karcher.....114

Energy Conversion and Storage

012011

OPEN ACCESS

[Transition between free, mixed and forced convection](#)

W Jaeger, F Trimborn, M Niemann, V Saini, W Hering, R Stieglitz, B Pritz, J Fröhlich and M Gabi.....124

012012

OPEN ACCESS

[Liquid metals for solar power systems](#)

J Flesch, K Niedermeier, A Fritsch, D Musaeva, L Marocco, R Uhlig, E Baake, R Buck and T Wetzel.....140

012013

OPEN ACCESS

[Liquid metal batteries - materials selection and fluid dynamics](#)

T Weier, A Bund, W El-Mofid, G M Horstmann, C-C Lalau, S Landgraf, M Nimtz, M Starace, F Stefani and N Weber.....155

012014

OPEN ACCESS

[Design and construction of the ATEFA facility for experimental investigations of AMTEC test modules](#)

N Diez de los Rios Ramos, W Hering, A Weisenburger, M Stüber, A Onea, M Lux, S Ulrich and R Stieglitz.....169

012015

OPEN ACCESS

[Development of high temperature liquid metal test facilities for qualification of materials and investigations of thermoelectrical modules](#)

A Onca, W Hering, J Reiser, A Weisenburger, N Diez de los Rios Ramos, M Lux, R Ziegler, S Baumgärtner and R Stieglitz.....183

012016

OPEN ACCESS

[Carbon dioxide free production of hydrogen](#)

L Stoppel, T Fehling, T Geißler, E Baake and T Wetzel.....192

Metals and Semiconductor Processing

012017

OPEN ACCESS

[Magnetic flow control in growth and casting of photovoltaic silicon: Numerical and experimental results](#)

A Poklad, J Pal, V Galindo, I Grants, V Heinze, D Meier, O Pätzold, M Stelter and G Gerbeth.....206

012018

OPEN ACCESS

[Modeling electromagnetically driven free-surface flows motivated by the Ribbon Growth on Substrate \(RGS\) process](#)

P Beckstein, V Galindo, A Schönecker and G Gerbeth.....215

012019

OPEN ACCESS

[Experimental and Numerical Modeling of Fluid Flow Processes in Continuous Casting: Results from the LIMMCAST-Project](#)

K Timmel, C Kratzsch, A Asad, D Schurmann, R Schwarze and S Eckert.....223

012020

OPEN ACCESS

[Casting technology for ODS steels – dispersion of nanoparticles in liquid metals](#)

M Sarma, I Grants, I Kaldre, A Bojarevics and G Gerbeth.....244

012021

OPEN ACCESS

[Casting technology for ODS steels - the internal oxidation approach](#)

S Miran, P Franke, A Möslang and H J Seifert.....251

012022

OPEN ACCESS

[Two cylinder permanent magnet stirrer for liquid metals](#)

A Bojarevičs, R Baranovskis, I Kaldre, M Milgrāvis and T Beinerts.....257

Measurement Techniques

012023

OPEN ACCESS

[Measurement techniques for liquid metals](#)

M Ratajczak, D Hernández, T Richter, D Otte, D Buchenau, N Krauter and T Wondrak.....265

012024

OPEN ACCESS

[On an Analog Controlled Precision Heat Power Source](#)

M Seilmayer and V K Katepally.....291

012025

OPEN ACCESS

[Electromagnetic interaction between a rising spherical particle in a conducting liquid and a localized magnetic field](#)

Z Lyu, N Tran, T Boeck and C Karcher.....303

012026

OPEN ACCESS

[Neutron radiography for visualization of liquid metal processes: bubbly flow for CO₂ free production of Hydrogen and solidification processes in EM field](#)

E Baake, T Fehling, D Musaeva and T Steinberg.....313