

# **International Conference on High-Power Electron Beam Technology 2012**

**(EBEAM 2012)**

**Reno, Nevada, USA  
14-16 October 2012**

**ISBN: 978-1-62748-495-4**

**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© (2012) by Von Ardenne  
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact Von Ardenne  
at the address below.

Von Ardenne  
Plattleite 19/29  
01324 Dresden Germany

Phone: +49 351 263 7300  
Fax: +49 351 263 7308

[office@vonardenne.biz](mailto:office@vonardenne.biz)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## 1ST SESSION: EB MELTING SESSION

*Moderator: R. Bakish*

Niobium Based Accelerators for Nuclear Waste Treatment and Nuclear Energy .....	1
<i>H. Padamsee</i>	
Application of a Laboratory EB Furnace to the Analysis of the Inclusion Cleanliness in Reactive	
Metals .....	31
<i>J. Jourdan, J. Ramsey, B. Defay, A. Jardy, P. Chapelle, J.P. Bellot</i>	
Aluminum Dissolution Mechanisms in Ti64 Alloy during Electron Beam Melt Processing.....	50
<i>Jun Ou, Aniruddha Chatterjee, Zhongkui Zhang, Carl Reilly, Ainul Akhtar, Lu Yao, Daan Maijer, Steve Cockcroft</i>	
Model-Based Approach for Quality Optimization of EBMR Process of Ta .....	64
<i>E. Koleva, V. Vassileva, D. Mollov, K. Vutova, G. Mladenov</i>	
The Set-up for Electron-Beam Float-Zone Growing Crystals .....	N/A
<i>V.G. Glebovsky</i>	

## 2ND SESSION EB MELTING SESSION

*Moderator: M. Neumann*

Description and Application of ALD's ESCOSYS Electron Beam Scan and Control System .....	73
<i>G. Reiter, J. Flinspach, H. Franz, J. Hotz, G. Schuhmann, U. Biebricher, D. Esser</i>	
Evaluation of Dry Vacuum Pumping Systems Applied to a Titanium Melting EBCHR Furnace: A	
Follow-up, Five Years Later... .....	96
<i>B.W. Martin, I.A. Grosse</i>	
New Testing Facility for Production Scale High Power Electron Beam Gun Systems .....	108
<i>J. Flinspach, U. Biebricher</i>	
Investigation of Electron Beam Drip Melting by a Time-dependent Heat Model .....	117
<i>Katia Vutova, Veliko Donchev, Vania Vassileva, Elena Koleva, Georgi Mladenov</i>	

## 3RD SESSION: EB WELDING & MELTING SESSION

*Moderator: Mark Pellman*

Quality Optimization at Electron Beam Welding of Steels .....	124
<i>E.G. Koleva, D.N. Trushnikov, V.Y. Belenki, G.M. Mladenov</i>	
Application of Local Vacuum, Reduced Pressure EB Welding in the Manufacture of High Quality,	
Thick Section Forgings for Critical Applications.....	N/A
<i>C. Punshon</i>	
Methodology and Economics of a Commercial Solar-grade Silicon Manufacturing Process .....	145
<i>William R. Imler, Robert E. Haun, Robin A. Lampson, Matthew Charles, Paul Meese, Samo Semenic</i>	
Thermal Processing of Materials at the Micrometer Scale - Challenges and Opportunities for the	
Electron Beam.....	151
<i>G. Mattausch, B. Graffel, F. Winckler, F. Roegner, M. Merkel, K. Wrobel, R. Boehme, H. Schlemm</i>	
State of the Art and Prospects of Application of Gas Discharge Electron Beam Guns in Melting and	
Refining Processes .....	159
<i>D. Kovalchuk, V. Melnyk, I. Melnyk, B. Tugai</i>	

## 4TH SESSION: RELATED TOPICS SESSION

*Moderator: David Esser*

The Future of EB & Plasma Melting .....	N/A
<i>H. Harker</i>	
Improved VON ARDENNE Electron Beam Systems for Melting, Coating and Heat Treatment .....	169
<i>Matthias Neumann</i>	
SMART EB/PVD Coater: The New Flexible Platform for EB Applications of TBC's of HP	
Components for Modern Aviation Turbines .....	183
<i>Jürgen Lemke, Pavel Sesenko, Jürgen Hotz</i>	
Novel Techniques and Tools for Plasma-activated EB-PVD of Dense Zirconia Coatings.....	201
<i>G. Mattausch, B. Scheffel, O. Zywicki, C. Metzner, F. Roegner</i>	
Author Index	