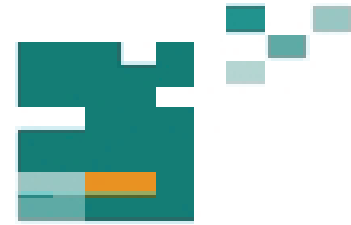


51. IWK

Internationales Wissenschaftliches Kolloquium
International Scientific Colloquium



PROCEEDINGS

11-15 September 2006

FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION SCIENCE



**INFORMATION TECHNOLOGY AND
ELECTRICAL ENGINEERING -
DEVICES AND SYSTEMS,
MATERIALS AND TECHNOLOGIES
FOR THE FUTURE**

Startseite / Index:

<http://www.db-thueringen.de/servlets/DocumentServlet?id=12391>

Impressum

Herausgeber: Der Rektor der Technischen Universität Ilmenau
Univ.-Prof. Dr. rer. nat. habil. Peter Scharff

Redaktion: Referat Marketing und Studentische
Angelegenheiten
Andrea Schneider

Fakultät für Elektrotechnik und Informationstechnik
Susanne Jakob
Dipl.-Ing. Helge Drumm

Redaktionsschluss: 07. Juli 2006

Technische Realisierung (CD-Rom-Ausgabe):
Institut für Medientechnik an der TU Ilmenau
Dipl.-Ing. Christian Weigel
Dipl.-Ing. Marco Albrecht
Dipl.-Ing. Helge Drumm

Technische Realisierung (Online-Ausgabe):
Universitätsbibliothek Ilmenau
[ilmedia](#)
Postfach 10 05 65
98684 Ilmenau

Verlag:  Verlag ISLE, Betriebsstätte des ISLE e.V.
Werner-von-Siemens-Str. 16
98693 Ilmenau

© Technische Universität Ilmenau (Thür.) 2006

Diese Publikationen und alle in ihr enthaltenen Beiträge und Abbildungen sind urheberrechtlich geschützt. Mit Ausnahme der gesetzlich zugelassenen Fälle ist eine Verwertung ohne Einwilligung der Redaktion strafbar.

ISBN (Druckausgabe): 3-938843-15-2
ISBN (CD-Rom-Ausgabe): 3-938843-16-0

Startseite / Index:
<http://www.db-thueringen.de/servlets/DocumentServlet?id=12391>

U. Krieger, B. Halbedel, D. Hülsenberg

Electromagnetic Stirring of Glass Melts - Characterization of the Homogenization Effects

ELECTRO-PROCESSING TECHNOLOGIES

Starting from first experimental results the characterization of the homogenization of glass melts by the electromagnetic stirring effects due to the generation of so called artificial Lorentz forces was realised by in-situ measurements of the temperature distribution in the melts during the experiments [1]. The laboratory equipment consists of a special arrangement of two electrodes and a magnet system for the generation of a electric current and magnetic field in the glass melt (using crucible as vessel).

Additional experience created by the investigation of the effects resulting from a time dependent change of parameters (e.g. electric current density, magnetic flux density, direction of Lorentz force). This leads to the determination of the thermal homogeneity and enables to conclude the significant parameter settings for the experiments with respect to an optimized thermal homogenization of the glass melt by electromagnetic assisted mixing.

Since the direct measurement of the velocity distribution in the melt is not possible due to the high temperatures we investigated the mixing behaviour for two different cases. First a transparent and a coloured melt (similar material properties) are positioned in a layered arrangement which creates characteristic striae during mixing [2]. Second an inhomogeneous distribution of two glasses with a significant difference in the chemical composition acts as a starting point for the experiments. After mixing we analyzed the chemical homogenization effects of the electromagnetic mixing in the glass melt.

Utilizing representative parameters from this experiments (in according with mixing quality) enables the comparison with other technical processes and fields of research. Based on this knowledge the potentials for the optimisation and improvement of glass production using Magnetohydrodynamics are concluded.

References:

- [1] HÜLSENBERG, D.; HALBEDEL, B.; CONRAD, G.; THESS, A.; KOLESNIKOV, J.; LÜDTKE, U. :
Electromagnetic Stirring of Glass Melts Using Lorentz Forces: Experimental Results :
Glass. Sci. Technol. **77** (2004), No.4, 186-193
- [2] KRIEGER, U.; HALBEDEL, B.; HÜLSENBERG, D.; LÜDTKE, U.; KOLESNIKOV, Y.; THESS, A. :
Elektromagnetische Strömungsbeeinflussung in Glasschmelzen :
Proceedings 79. Glastechnische Tagung, Würzburg, May 24-25, 2005

Authors:

Title first name surname	Dipl.-Ing. Uwe Krieger
Title first name surname	Dr. Bernd Halbedel
Title first name surname	Prof. Dr.rer.oec. Dr.-Ing. Dagmar Hülsenberg
Company, street, P.O.B.	TU-Ilmenau, Gustav Kirchhoffstraße, P.O.B. 100565
Zip code, city	98684, Ilmenau
Phone:	+49+3677-691561
Fax:	+49+3677-691436
E-mail:	Uwe.Krieger@tu-ilmenau.de