

Table of Contents

Sponsors

Sales and Service Representative

Committees

Referees

Preface

Section 1: Glass Structure

Liquids, Glasses, Density Fluctuations and Low Frequency Modes G.N. Greaves, M.C. Wilding, F. Kargl and L. Hennet	3
A new Experimental Way to Obtain Information about Glass Nano-Heterogeneous Structure P. Baltă	13
Structural Role and Distribution of Alkali and Alkaline-Earth Cations in Rare Earth-Rich Aluminoborosilicate Glasses D. Caurant, A. Quintas, O. Majerus, T. Charpentier and I. Bardez	19
Solid State NMR Study of Calcium Fluoroaluminosilicate Glasses N. Karpukhina, R.V. Law and R.G. Hill	25
Structural Features of Nano-Scaled Metamaterials Containing PbS Nanocrystals A.A. Onushchenko, V.V. Golubkov and A.A. Zhilin	31
Glass Formation in the MoO₃-La₂O₃-Nd₂O₃ System L. Aleksandrov, R. Iordanova, Y.B. Dimitriev, K. Handa, J. Ide and M. Milanova	37
Spatial Distribution of Heavy Metal Ions in Glass Forming Melts: Spectroscopic and Physical-Chemical Study A. Anan'ev and L. Maksimov	41
Structural Models of Selenite Glasses Containing Ag⁺ and Cu²⁺ Ions A. Bachvarova-Nedelcheva, R. Iordanova and Y.B. Dimitriev	45
Network-Forming Ions Diffusion in Metasilicate and Pyrophosphate Melts: Molecular Dynamics Simulation G.G. Boiko and G.V. Berezhnoi	49
Synthesis and Selected Properties of Silicate Hybrids Containing Sepharose G. Chernev, B. Samuneva, P. Djambaski, L. Kabaivanova, E. Emanuilova, I.M. Miranda Salvado and A.Y. Wu	53
Influence of Montmorillonite Clay on Structure and Properties of Sodium Borate Glasses E. Diamanti, A. Lekatou, T. Matikas and M.A. Karakassides	57
Characterization of Aluminophosphate Glasses Containing Pr³⁺, Er³⁺, Gd³⁺ and Yb³⁺ Ions M. Elisa, I.C. Vasiliu, C.E.A. Grigorescu, B. Grigoras, H. Nicu, D. Nicu, A. Meghea, N. Iftimie, M. Giurginca, P. Roxana, J. Trodahl and M. Dalley	61
Structural Changes in Alkali Depleted Alkali-Silicate Glass – MD Study O. Gedeon, S. Charvátová and J. Macháček	65
Structural Model of K₂O-GeO₂-P₂O₅ Glasses Based on Diffraction Results U. Hoppe, G. Walter, R.K. Brow and N.P. Wyckoff	69
Glass Formation and Structure of the Glasses in the MoO₃-Nd₂O₃-Bi₂O₃ System R. Iordanova, L. Aleksandrov, A. Stoyanova and Y.B. Dimitriev	73
Silicon Oxycarbide Glasses from Gel Hybrid Structures Y.Y. Ivanova and Y.E. Vueva	77
The Effect of CaO and MgO on Physical Properties of MgO-CaO-B₂O₃-Al₂O₃-SiO₂ Glasses with Composition Close to the E-Glass Fibers J. Kraxner, R. Klement, M. Chromčíková and M. Liška	81
First Principles Molecular Simulations of Soda-Lime-Silica Glass J. Macháček, S. Charvátová, O. Gedeon and M. Liška	85
Volumetric Changes Between Different Conformations of Two SiOH Groups in SiO₂ Glass M. Mlejnek and S. Kuchinsky	89

The Yttria-Alumina Glasses - MD and TD Models	
P. Perichta, M. Liška, J. Macháček and O. Gedeon	93
Zinc Borophosphate Glasses Doped with Molybdenum Oxide	
J. Šubcík, L. Koudelka, P. Mošner and Z. Černošek	97

Section 2: Thermodynamics, Rheology and the Glass Transition

The Structure-Property Relationship in Oxide Glasses: A Thermodynamic Approach	
N.M. Vedishcheva, B.A. Shakhmatkin and A.C. Wright	103
Transport and Relaxation Study of Ionic Phosphate Glasses	
P. Bury, P. Hockicko and M. Jamnický	111
Glass as Solid Non-Equilibrium Phase under Negative Pressure	
L. Landa, S. Thomsen and R. Hulme	117
New Paradigm of Glass Structure and Physicochemical Essence of Glass Transition	
V. Minaev, I. Terashkevich, S. Timoshenkov, V. Kalugin and S. Novikov	123
Basicity or Ionicity – A New Approach for Understanding Glass Properties	
A. Volceanov	129

Section 3: Physical Properties of Glass

Poisson's Ratio and the Glass Network Topology - Relevance to High Pressure Densification and Indentation Behavior	
T. Rouxel, H. Ji, V. Keryvin, T. Hammouda and S. Yoshida	137
Glass Property Databases: Their History, Present State, and Prospects for Further Development	
A.I. Priven and O.V. Mazurin	147
Properties of Silica Glass Doped with Titanium Oxide	
V. Pukh, L. Baikova, M. Kireenko and L. Tikhonova	153
Raman Spectroscopic and DTA Studies of TeO₂-ZnO-Na₂O Tellurite Glasses	
S.X. Shen and A. Jha	159
Stress Strain Testing of the Strand of E-Glass Fibers	
M. Chromčíková and M. Liška	165
Basicity-Gibbs Free Energy Relationships for Binary Alkali Silicates	
O. Dumitrescu and D. Radu	169
Structure and Properties of Selected Zirconia Silicate Glasses	
R. Karell, M. Chromčíková and M. Liška	173
Thermal Stability and Microstructure of Glasses and Glass-Ceramics in the System La₂O₃-PbO-MnO-B₂O₃	
E. Kashchieva, N. Dulguerov, A. Staneva and Y.B. Dimitriev	177
Study of Lithium-Lead Phosphate and Borophosphate Glasses	
P. Mošner, L. Koudelka, J. Jirák and M. Vlček	181
Some Physical Properties of Li₂O-TiO₂-TeO₂ and BaO-TiO₂-TeO₂ Glasses	
J. Ozdanova, H. Ticha and L. Tichy	185
Y₂O₃ – Al₂O₃ Binary Glass Microspheres: Synthesis and Characterisation	
A. Prnová, R. Karell and D. Galusek	189
Correlation of Surface Characteristics and Thermal Conductivity of High Silica Glass Fibre Materials	
J. Setina, V. Akishins and L. Petersone	193

Section 4: Optical, Electrical and Magnetic Properties of Glass

Convolution Models for the Dielectric Function of Glass	
P.A. van Nijnen	199
Magnetic Properties of Amorphous Fe₂O₃-R₂O₃ (R=La, Gd and Tb) Thin Films Fabricated by Sputtering Method	
H. Akamatsu, S. Murai, K. Fujita and K. Tanaka	207

Spectral, Radiation-Optical and Shielding Properties of Phosphate Glasses with High Lead Content	
V.I. Arbuzov and Y.K. Fyodorov	213
Formation and Passive Q-Switch Performance of Glass-Ceramics Containing Co²⁺-Doped Spinel Nanocrystals	
O. Dymshits, A. Shashkin, A.A. Zhilin, Y. Volk, A. Malyarevich and K. Yumashev	219
Influence of Technological Parameters on Nanosecond Laser-Induced Surface Damage of Optical Multimode Fibers	
M. Eberstein, G. Mann, J. Vogel, M. Zoheidi and J. Krüger	225
Luminescent ZnO-Al₂O₃-SiO₂ Glasses and Glass Ceramics	
D. Ehrt, H.T. Vu, A. Herrmann and G. Völksch	231
Introduction of Silver in Poled Sodium and Niobium Borophosphate Glasses: Characterization by Electrical Transmitted Current and SHG Measurements	
E. Fargin, M. Dussauze, A. Malakho, A. Delestre, V. Rodriguez and F. Adamietz	237
Thermal Stability and Optical Properties of Er³⁺ Doped BaTi₂O₅ Glasses	
A. Masuno, H. Inoue, J. Yu, Y. Arai and F. Otsubo	243
Second-Harmonic Generation in Thermally Poled Na₂O-Al₂O₃-TeO₂ Glasses	
S. Ukon, Y. Tsujiie, S. Murai, K. Fujita and K. Tanaka	247
Optical Transitions in Chalcogenide Glasses From the Point of View of a Barrier-Cluster Model	
I. Baník	253
Lead-Free High Refractive Index Glasses Produced from Local Raw Materials	
P. Dararutana, P. Chetanachan, J. Dutchaneepheth and N. Sirikulrat	257
7- and 19-Element-Core Bend-Resistant Microstructured Fibers	
K.V. Dukel'skii, A.V. Komarov, A.V. Khokhlov, E.V. Ter-Nersesyantz and V.S. Shevandin	261
Fluorine Containing High-Silica Glasses for Speciality Optical Fibers	
J. Kirchhof, S. Unger and B. Knappe	265
The Influence of the Vitreous Matrix for the Determination of the Lanthanides Doping Concentration from the Optical Transmission Spectra	
H. Nicu, D. Radu, C. Onose, V. Maduta, D. Nicu, H. Stroescu and C.S. Onose	269
Anomalously Low Light Scattering in the Na₂O-Nb₂O₅-SiO₂ Glass-Ceramics	
M. Shepilov, O. Dymshits, V.V. Golubkov and A.A. Zhilin	273

Section 5: Bioglass and Chemical Durability

Complex Study of E-Glass Corrosion	
P. Šlemín, G. Heide and A. Helebrant	279
Liquidus Temperatures of Bioactive Glasses	
H. Arstila, M. Tukiainen, S. Taipale, M. Kellomäki and L. Hupa	287
Simulation of the Chemical Influences to the Polishing Process of Optical Glasses	
E. Becker, A. Prange and R. Conradt	293
Fluoride-Containing Bioactive Glasses	
D.S. Brauer, N. Karpukhina, D. Seah, R.V. Law and R.G. Hill	299
Soda-Lime-Silica Glass Containers: Chemical Durability and Weathering Products	
M.H. Chopinet, M. Verità, R. Falcone, P. Lehuédé, M. Vallotto, M. Nardone and A. Sodo	305
The Corrosion of E-Glass Fibres in Complexing Organic Acids	
R.L. Jones	311
Dishwasher Corrosion of Glasses	
M. Orhon, İ. Sökmen and G. Albayrak	317
Mechanism of Generation of Tableware Surface Defects during Dishwashing Process	
V. Petrušková, P. Vrábel and P. Šajgalík	323
Biomedical Thermodynamics and Implantology Aspects of Biocompatible Glass-Ceramics and Otherwise Modified Inorganic Materials and Surfaces	
J. Šesták, Z. Strnad, J. Strnad, M. Holeček and N. Koga	329
Phospho-Silicate Glasses, Self-Degradable in Environment Conditions	
L. Stoch, I. Waclawska and M. Szumera	335
Continuous Measurement of the Dissolution Rate of Ions from Glasses	
S. Taipale, P. Ek, M. Hupa and L. Hupa	341

Kinetics of SiO₂ Nanofibres Dissolution in the Simulated Lung Environment	347
L. Brázda, J. Studničková, P. Exnar and A. Helebrant	
Glass Surface Analysis by an Optimized Sequential Chemical Etching Technique Using the Corrosive Agent HF/HNO₃	347
P. Djambazov, A. Prange and R. Conradt	
Kinetics of E-glass Fibres Leaching in Borate Solution and Distilled Water	351
L. Mišková and M. Liška	
Ageing of Clay-Based Materials	355
A. Pešová, J. Andertová, V. Machovič and O. Gedeon	
Chemical Durability of Glass Thermal Insulation Fibers in Borate and Phosphate Water Solutions	359
V. Soltész, I. Vicena, M. Chromčíková, M. Liška and J.M. Mattei	
	363

Section 6: Nucleation, Crystallization and Sintering

The Influence of Metal Diffusion and Interfacial Reactions on the Crystallization Behaviour of Glasses Employed in the Manufacture of Glass-Ceramic-to-Metal Seals	369
I.W. Donald, B.L. Metcalfe and L.A. Gerrard	
Effects of Dispersed Al₂O₃ Particles on Sintering of LTCC	375
R. Müller, S. Reinsch, M. Eberstein, J. Deubener, A. Thiel and W.A. Schiller	
β-Spodumene Glass-Ceramic with Anomalous Low Thermal Expansion	381
A. Sakamoto, Y. Himei and Y. Hashibe	
Electron Microscopic Investigations of Electrochemically Induced Mullite Crystallization in a Glassy Matrix	387
R. Carl, G. Völksch and C. Rüssel	
Crystallization of Glasses in the MoO₃-Bi₂O₃ System	391
R. Iordanova, M. Milanova, A. Stoyanova and C. Iliev	
Evolution of Absorption Spectra in the Process of Nucleation in Photo-Thermo-Refractive Glass	395
J. Lumeau, L. Glebova and L.B. Glebov	
Thermal Stability vs. Crystallization of the Lithiumsilicate Glasses with Addition Zirconium Dioxide and Titanium Dioxide	399
V. Pavlík, E. Jóna, M. Sapietová and S. Šnircová	

Section 7: Glass Melting

Developments in Glass Melting Furnace Design, Energy and Environmental Management	405
J. Bayram, L. Kaya and B. Orhan	
Sulfur Functioning during Glass Melting	413
M. Arkosiová, J. Kloužek and L. Němec	
The Influence of Glass Melt Flow Character on the Bubble Removal Process	419
P. Cincibusová, L. Němec and J. Brada	
CO₂ Neutral Glass Manufacturing? – A Study of the Possibilities	425
B. Jonson, B. Zethraeus, R. Beerkens and A. Lankhorst	
Distribution of Power Density in the Glass Melt at Different Electrode Configurations in All-Electric Furnace	431
S. Kasa	
Nitrogen and Argon in Borosilicate Glass: Solubility, Diffusivity, Residual Gas Concentration and Behaviour of Bubbles in Glass Melts, Containing Both Gases	437
D. Köpsel, M. Booß, M. Opyd and M.L. Aigner	
In-Line Oxygen Sensors for the Glass Melt and the Float Bath	443
P. Laimböck	
What is the Ideal Glass Bath Depth of a Glass Furnace?	447
H.P.H. Muijsenberg, M. Muijsenberg and J. Chmelar	
Some Opportunities to Improve Glass Melting	453
L. Němec and M. Jebavá	

Chemical Reactions in a Soda-Lime Silicate Batch	459
F. Novotný and R. Lošot	
Parallel Cooperation of Robots during Handling with Jumbo Glass Sheets	465
F. Novotný and M. Horák	
Simulation of Electrical Heating with Multiple Transformers	469
P. Simons and A. Habraken	
The Bubble Behaviour under Effect of Centrifugal Force	475
V. Tonarová and L. Němec	
Identification of Rayleigh-Bénard Convection on Physical Model of Electric Furnace	481
A. Lisý and J. Smrček	
Modeling of Glass Melting Process in Plasma-Fired Skull Furnace	485
O.A. Prokhorenko	
The Influence of Water Present in the Batch on the Fining Process of Lead Crystal Containing More than 24 % by Weight of PbO	489
M. Rada and J. Vršovský	

Section 8: Glass Forming and Glass Production

Simulation Tools for Glass Forming Processes by Drawing	495
C. Berndhäuser and U. Lange	
Advanced Simulation of 3D Glass Bottle Forming with Abaqus	499
G. de Leede, R. Koch, V. Bouwman and G. Kloosterman	
Glass Decoration Elements – History and Technology	505
E. Greiner-Wronowa	
Monitoring of Glass Production Using Vision Systems	511
V. Hotař	
Effect of Isopipe Temperature on the Glass Sheet Forming for Overflow Fusion Process by Numerical Simulation	517
H.J. Lin, F.Y. Hsu and W.K. Chang	
Application of the TRIZ Method for Development and Evaluation of Innovations in Glass Processing for the 21st Century	523
P. Jirman and I. Matoušek	
Measurement and Calculation of Residual Stress in Axi-Symmetric Glass Sample Using Structural Relaxation Theory	529
N. Krečmer, M. Liška, J. Chocholoušek and P. Vrábel	
Virtual Modeling of Dynamic Loading of Glass Mould	535
I. Matoušek	
Behavior of Zinc Selenite, Calcium Selenite and Metallic Selenium as Decolorizing Agents in Flint Glass Production	541
H. Müller-Simon and P. Griebenow	
Problem of Determination of Optimal Supports Position for Jumbo Flat Glass with Free Edges	547
P. Salač and M. Horák	
Numerical and Experimental Investigations on the Residual Stresses at the Centre of Flat Glass Disks After Thermal Tempering	553
F. Soulié, N. Siedow, J. Anton and D. Lochegnies	
Analysis of Industrial Glass by Portable μ-EDXRF	559
A. Agostino, R. Falcone, M. Vallotto and M. Verità	
Nickel Sulphide Inclusions in Tempered Glass	563
S. Bielecki, M. Reben and J. Wasylak	
Properties of Glass Surface with Nano-Particles Aluminum Compounds Refined	567
M. Drajewicz and J. Wasylak	
Defects of Golden and Luster Decorations on Glass	571
H. Hradecká and D. Rohanová	
Fast and Accurate Simplified Radiative Model for Modeling Coupled Heat Transfers in Glass Forming Process	575
H.Q. Nguyen, B. Remy and A. Degiovanni	

The Permanently Bonded Glass Decor from Chemical Precursors H. Niciu, D. Radu, C. Onose, A. Ioncea, D. Niciu, H. Stroescu and C.S. Onose	579
Rate Controlled Debinding of Glass Ceramic Composites S. Reinsch, M. Gaber, R. Müller and W.A. Schiller	583
Analysis of Tableware Mouth Impact Strength J. Sabošová, P. Vrábel and P. Šajgalík	587

Section 9: Refractories

Recent Problems in Glass Melting from the View Point of Refractory and its Solutions N. Kido	593
Boundary Layers Refractory/Glass Melt and Glass Defects M. Dunkl	601
The Microstructure of Fused Cast AZS Materials before, during and after the Use for Glass Melting B. Fleischmann	607
The Glass Related Properties of the SIBOR® Oxidation Protective Coating on Molybdenum Alloys H.P. Martinz, B. Nigg, J. Matej, M. Sulik and H. Larcher	613
Environmental Impact for Regenerators Materials Selection in Soda-Lime Flat Glass Furnaces J.P. Meynckens and B. Cherdon	619
Modern Technology of Molybdenum Disilicide (MoSi₂) Heating Elements MolyCom®-Ultra and MolyCom®-Hyper M.E. Schupp and M. Herweg	625

Section 10: Ecology and Waste Materials

Nuclear Waste Glasses: Continuous Melting and Bulk Vitrification P. Hrma and A.A. Kruger	633
Reduction of Gaseous Boron Compounds in the Waste Gas of Glass Melting Furnaces K. Gitzhofer	641
Condensation during Flue Gas Cleaning A. Neumann, W. Wilsmann and R. Conradt	647
Effect of Small Glass Composition Changes on Flue Gas Emissions of Glass Furnaces H. van Limpt, R. Beerkens and M. van Kersbergen	653
Study on the Recycling of Borate Silicate Vitreous Waste with Capitalization of Heavy Metals Sludge A. Diaconu, B.A. Sava, L.D. Ursu, I. Mitiu, E. Rosu, D. Radu, O. Dumitrescu and M. Eftimie	659
Glazes Using E-Glass Fibers Waste V. Dima, A. Volceanov, M. Eftimie, A. Petrescu, M. Ionescu, N. Ziman and E. Volceanov	663
Ecological Silicate Glasses B.A. Sava, A. Diaconu, L.D. Ursu, L. Boroica, M. Elisa, C.E.A. Grigorescu, I.C. Vasiliu, I. Stamatin, F. Nastase, C. Nastase and A. Dumitru	667
Structure and Properties of ¹³⁷Cs Containing Waste Glass P. Stoch	671
A Study of the Industrial Waste Incorporating in Glass L.D. Ursu, A. Diaconu, B.A. Sava, L. Boroica, I. Mitiu, E. Rosu, D. Radu, M. Dinulescu and M. Eftimie	675
Utilization of Cement Furnace Dust to Produce Colored Vials & its Using in Epoxy Glass Floor M.A.H. Zinhom, I.M. Youssif and N.A. Gawad	679