Fluoride-containing bioactive glass-ceramics

Author(s): Brauer, DS (Brauer, D. S.)[1] ; Anjum, MN (Anjum, M. N.)[2] ; Mneimne, M (Mneimne, M.)[1] ; Wilson, RM (Wilson, R. M.)[2] ; Doweidar, H (Doweidar, H.)[3] ; Hill, RG (Hill, R. G.)[1]

Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 358 Issue: 12-13 Pages: 1438-1442 DOI: 10.1016/j.jnoncrysol.2012.03.014 Published: JUL 1 2012

Abstract:

Fluorapatite glass-ceramics are osteoconductive. and glass-ceramics containing fluorapatite crystals in a bioactive silicate glass matrix can combine the benefits of fluorapatite with the bone-regenerative properties of bioactive glasses. High phosphate content (around 6 mol% P2O5) bioactive glasses (SiO2-P2O5-CaO-Na2O-CaF2) were prepared by a melt-quench route. Structural investigation using density measurements and calculations confirmed the presence of phosphorus as orthophosphate. Upon heat treatment, the glasses crystallised to mixed sodium calcium fluoride orthophosphates (sodium-containing compositions) and fluorapatite (sodium-free composition). Fluoride suppressed spontaneous crystallisation, allowing formation of glass-ceramics by controlled crystallisation. A notable feature is that silicate network polymerisation and network connectivity did not change during crystallisation, resulting in orthophosphate and fluorapatite crystals embedded within a bioactive glass matrix. By keeping the phosphate content high and the sodium content low, fluorapatite glass-ceramics can be obtained, while not affecting the structure of the bioactive silicate glass phase. (C) 2012 Elsevier B.V. All rights reserved.

Accession Number: WOS:000306822000005
Document Type: Article
Language: English
Author Keywords: Apatite; Bioactive glass; Biomedical applications; Fluorapatite; Fluoride
KeyWords Plus: LIME PHOSPHOSILICATE GLASSES; P2O5 CONTENT; SILICATE GLASSES; STRUCTURAL ROLE; 2 SERIES; NMR; DENSITY

Reprint Address: Brauer, DS (reprint author), Univ Jena, Otto Schott Inst, Fraunhoferstr 6, D-07743 Jena, Germany.

Addresses:

[1] Queen Mary Univ London, Unit Dent Phys Sci, Barts & London Sch Med & Dent, London E1 4NS, England
[2] Queen Mary Univ London, Sch Engn & Mat Sci, London E1 4NS, England
[3] Mansoura Univ, Fac Sci, Glass Res Grp, Dept Phys, Mansoura 35516, Egypt

E-mail Address: delia.brauer@uni-jena.de

Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Web of Science Categories: Materials Science, Ceramics; Materials Science, Multidisciplinary
Research Areas: Materials Science
IDS Number: 979LR
ISSN: 0022-3093

References

1. Title: Fluoride: A toxic or therapeutic agent in the treatment of osteoporosis?
Author(s): Aaseth, J; Shimshi, M; Gabrilove, JL; et al.
Source: JOURNAL OF TRACE ELEMENTS IN EXPERIMENTAL MEDICINE Volume: 17 Issue: 2 Pages: 83-92 DOI: 10.1002/jtra.10051 Published: 2004

2. Title: VISCOSITIES IN SILICATE SLAG SYSTEMS
Author(s): BILLS, PM
Source: JOURNAL OF THE IRON AND STEEL INSTITUTE Volume: 201 Issue: 2 Pages: 133-& Published: 1963

3. Title: Structure of fluoride-containing bioactive glasses
Author(s): Brauer, Delia S.; Karpukhina, Natalia; Law, Robert V.; et al.
Source: JOURNAL OF MATERIALS CHEMISTRY Volume: 19 Issue: 31 Pages: 5629-5636 DOI: 10.1039/b900956f Published: 2009

4. Title: Fluoride-containing bioactive glasses: Fluoride loss during melting and ion release in tris buffer solution
Author(s): Brauer, Delia S.; Mneimne, Mohammed; Hill, Robert G.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 357 Issue: 18 Pages: 3328-3333 DOI: 10.1016/j.jnoncrysol.2011.05.031 Published: SEP 15 2011

5. Title: Density-structure correlations in fluoride-containing bioactive glasses
Author(s): Brauer, D. S.; Al-Noaman, A.; Hill, R. G.; et al.
Source: MATERIALS CHEMISTRY AND PHYSICS Volume: 130 Issue: 1-2 Pages: 121-125 DOI: 10.1016/j.matchemphys.2011.06.015 Published: OCT 17 2011

6. Title: Crystallisation of fluoride-containing bioactive glasses
Author(s): Brauer, Delia S.; Hill, Robert G.; O'Donnell, Matthew D.
Conference: International Conference on the Chemistry of Glasses and Glass-Forming Melts Location: Oxford, ENGLAND Date: SEP, 2011
Source: PHYSICS AND CHEMISTRY OF GLASSES-EUROPEAN JOURNAL OF GLASS SCIENCE AND TECHNOLOGY PART B Volume: 53 Issue: 2 Pages: 27-30 Published: APR 2012

7. Title: Fluoride: Mode of action
Author(s): Caverzasio, J; Palmer, G; Bonjour, JP
Source: BONE Volume: 22 Issue: 6 Pages: 585-589 DOI: 10.1016/S8756-3282(98)00058-1 Published: JUN 1998

8. Title: Density-structure correlations in Na2O-CaO-P2O5-SiO2 bioactive glasses
Author(s): Doweidar, H.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 355 Issue: 9 Pages: 577-580 DOI: 10.1016/j.jnoncrysol.2009.02.007 Published: APR 15 2009

9. Title: Structural analysis of bioactive glasses
Author(s): Elgayar, I; Aliev, AE; Boccaccini, AR; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 351 Issue: 2 Pages: 173-183 DOI: 10.1016/j.jnoncrysol.2004.07.067 Published: JAN 15 2005

10. Title: The science and practice of caries prevention
Author(s): Featherstone, JDB

Source: JOURNAL OF THE AMERICAN DENTAL ASSOCIATION Volume: 131 Issue: 7 Pages: 887-899 Published: JUL 2000

11. Title: Crystallization modifies osteoconductivity in an apatite-mullite glass-ceramic
Author(s): Freeman, CO; Brook, IM; Johnson, A; et al.
Source: JOURNAL OF MATERIALS SCIENCE-MATERIALS IN MEDICINE Volume: 14 Issue: 11 Pages: 985-990 DOI: 10.1023/A:1026306901058 Abstract Number: A2004-07-8770G-008; B2004-04-7520-008 Published: NOV 2003

12. Title: Novel bioactive functionally graded coatings on Ti6Al4V
Author(s): Gomez-Vega, JM; Saiz, E; Tomsia, AP; et al.
Source: ADVANCED MATERIALS Volume: 12 Issue: 12 Pages: 894-898 DOI: 10.1002/1521-4095(200006)12:12<894::AID-ADMA894>3.0.CO;2-4 Abstract Number: A2000-21-6860-009 Published: JUN 16 2000

13. Title: Phosphate speciation in Na2O-CaO-P2O5-SiO2 and Na2O-TiO2-P2O5-SiO2 glasses
Author(s): Grussaute, H; Montagne, L; Palavit, G; et al.
Conference: 15th University Conference on Glass Science Location: UNIV MISSOURI ROLLA, ROLLA, MISSOURI Date: JUN 20-23, 1999
Sponsor(s): Univ Missouri Rolla
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 263 Issue: 1-4 Pages: 312-317 DOI: 10.1016/S0022-3093(99)00643-2 Abstract Number: A2000-08-6140D-032 Published: MAR 2000

14. Title: The story of Bioglass (R)
Author(s): Hench, Larry L.
Conference: 1985 ANNUAL CONVENTION OF THE AMERICAN PSYCHOLOGICAL ASSOC Location: LOS ANGELES, CA Date: 1985
Sponsor(s): AMER PSYCHOL ASSOC
Source: JOURNAL OF MATERIALS SCIENCE-MATERIALS IN MEDICINE Volume: 17 Issue: 11 Pages: 967-978 DOI: 10.1007/s10856-006-0432-z Published: NOV 2006

15. Title: Trimethylsilylation analysis of the silicate structure of fluoro-alumino-silicate glasses and the structural role of fluorine
Author(s): Hill, R; Wood, D; Thomas, M
Source: JOURNAL OF MATERIALS SCIENCE Volume: 34 Issue: 8 Pages: 1767-1774 DOI: 10.1023/A:1004550907134 Published: APR 15 1999

16. Title: Predicting the bioactivity of glasses using the network connectivity or split network models
Author(s): Hill, Robert G.; Brauer, Delia S.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 357 Issue: 24 Pages: 3884-3887 DOI: 10.1016/j.jnoncrysol.2011.07.025 Published: DEC 2011

17. Title: Structure, surface reactivity and physico-chemical degradation of fluoride containing phospho-silicate glasses

Author(s): Kansal, Ishu; Goel, Ashutosh; Tulyaganov, Dilshat U.; et al.
Source: JOURNAL OF MATERIALS CHEMISTRY Volume: 21 Issue: 22 Pages: 8074-8084 DOI: 10.1039/c1jm10811e Published: 2011

18.Title: [not available]
Author(s): Kumar, D.; Ward, R.G.; Williams, D.J.
Source: Discuss. Faraday Soc. Volume: 32 Pages: 147 DOI: 10.1039/df9613200147 Published: 1961

19. Title: Multinuclear solid-state NMR studies of ordered mesoporous bioactive glasses
Author(s): Leonova, Ekaterina; Izquierdo-Barba, Isabel; Arcos, Daniel; et al.
Source: JOURNAL OF PHYSICAL CHEMISTRY C Volume: 112 Issue: 14 Pages: 5552-5562 DOI: 10.1021/jp7107973 Published: APR 10 2008

20. Title: NMR INVESTIGATION OF THE STRUCTURE OF SOME BIOACTIVE AND RELATED GLASSES
Author(s): LOCKYER, MWG; HOLLAND, D; DUPREE, R
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 188 Issue: 3 Pages: 207-219 DOI: 10.1016/0022-3093(95)00188-3 Abstract Number: A1995-19-7660C-005 Published: AUG 1995

21. Title: Quantitative Structure-Property Relationships of Potentially Bioactive Fluoro Phospho-silicate Glasses
Author(s): Lusvardi, G.; Malavasi, G.; Tarsitano, F.; et al.
Source: JOURNAL OF PHYSICAL CHEMISTRY B Volume: 113 Issue: 30 Pages: 10331-10338 DOI: 10.1021/jp809805z Published: JUL 30 2009

22. Title: Elucidation of the structural role of fluorine in potentially bioactive glasses by experimental and computational investigation
Author(s): Lusvardi, G.; Malavasi, G.; Cortada, M.; et al.
Source: JOURNAL OF PHYSICAL CHEMISTRY B Volume: 112 Issue: 40 Pages: 12730-12739 DOI: 10.1021/jp803031z Published: OCT 9 2008

23. Title: Influence of P2O5 content on the structure of SiO2-Na2O-CaO-P2O5 bioglasses by Si-29 and P-31 MAS-NMR
Author(s): Mercier, Cyrille; Follet-Houttemane, Claudine; Pardini, Aurelie; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 357 Issue: 24 Pages: 3901-3909 DOI: 10.1016/j.jnoncrysol.2011.07.042 Published: DEC 2011

24. Title: High phosphate content significantly increases apatite formation of fluoride-containing bioactive glasses
Author(s): Mneimne, Mohammed; Hill, Robert G.; Bushby, Andrew J.; et al.
Source: ACTA BIOMATERIALIA Volume: 7 Issue: 4 Pages: 1827-1834 DOI: 10.1016/j.actbio.2010.11.037 Published: APR 2011

25.Title: Effect of P2O5 content in two series of soda lime phosphosilicate glasses on structure

and properties - Part I: NMR
Author(s): O'Donnell, M. D.; Watts, S. J.; Law, R. V.; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 30 Pages: 3554-3560 DOI: 10.1016/j.jnoncrysol.2008.03.034 Published: JUL 15 2008

26. Title: Effect of P2O5 content in two series of soda lime phosphosilicate glasses on structure and properties - Part II: Physical properties
Author(s): O'Donnell, M. D.; Watts, S. J.; Law, R. V.; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 30 Pages: 3561-3566 DOI: 10.1016/j.jnoncrysol.2008.03.035 Published: JUL 15 2008

27. Title: New Insights into the Atomic Structure of 45S5 Bioglass by Means of Solid-State NMR Spectroscopy and Accurate First-Principles Simulations
Author(s): Pedone, Alfonso; Charpentier, Thibault; Malavasi, Gianluca; et al.
Source: CHEMISTRY OF MATERIALS Volume: 22 Issue: 19 Pages: 5644-5652 DOI: 10.1021/cm102089c Published: OCT 12 2010

28. Title: Anti-gingivitis effect of a dentifrice containing bioactive glass (NovaMin (R)) particulate
Author(s): Tai, BJ; Bian, Z; Jiang, H; et al.
Source: JOURNAL OF CLINICAL PERIODONTOLOGY Volume: 33 Issue: 2 Pages: 86-91 DOI: 10.1111/j.1600.051X.2005.00879.x Published: FEB 2006

29. Title: Effect of strontium in combination with fluoride on enamel remineralization in vitro.
Author(s): Thuy, Tran Thu; Nakagaki, Haruo; Kato, Kazuo; et al.
Source: Archives of oral biology Volume: 53 Issue: 11 Pages: 1017-22 DOI: 10.1016/j.archoralbio.2008.06.005 Published: 2008-Nov (Epub 2008 Jul 30)

30. Title: A preliminary study of an aluminum-free glass polyalkenoate cement
Author(s): Towler, MR; Crowley, CM; Murphy, D; et al.
Source: JOURNAL OF MATERIALS SCIENCE LETTERS Volume: 21 Issue: 14 Pages: 1123-1126 DOI: 10.1023/A:1016570819402 Abstract Number: A2002-24-8120Q-004 Published: JUL 15 2002

31. Title: Effects of treatment with fluoride on bone mineral density and fracture risk - a meta-analysis
Author(s): Vestergaard, P.; Jorgensen, N. R.; Schwarz, P.; et al.
Source: OSTEOPOROSIS INTERNATIONAL Volume: 19 Issue: 3 Pages: 257-268 DOI: 10.1007/s00198-007-0437-6 Published: MAR 2008
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 358 Issue: 5 Pages: 941-946 DOI: 10.1016/j.jnoncrysol.2012.01.004 Published: MAR 1 2012

Structure and properties of CaF2-B2O3 glasses

Author(s): Doweidar, H (Doweidar, H.)[1]; El-Damrawi, G (El-Damrawi, G.)[1]; Abdelghany, M (Abdelghany, M.)[1]

Source: JOURNAL OF MATERIALS SCIENCE Volume: 47 Issue: 9 Pages: 4028-4035
DOI: 10.1007/s10853-012-6256-y Published: MAY 2012

Abstract:
FTIR spectroscopy has been employed to investigate the structure of CaF2-B2O3 glasses. It is proposed that CaF2 partially modifies the borate network forming Ca-1/2(2+)[BO3/2F](-) units. The rest of CaF2 is assumed to build an amorphous network formed of CaF4 tetrahedra. Analysis of density and molar volume revealed that the volume of CaF4 tetrahedron in the studied glasses is slightly greater than that in the crystalline form. Data of density, molar volume, and electric conductivity have been correlated with the glass structure. As far as the authors know, CaF2-B2O3 glasses are investigated for the first time.

Accession Number: WOS:000302241900011

Document Type: Article

Language: English

KeyWords Plus: SODIUM-BORATE GLASSES; LEAD FLUOROBORATE GLASSES; NAF-NA2O-B2O3 GLASSES; SYSTEM; FLUORIDE; SPECTRA; DENSITY; SPECTROSCOPY; RESONANCE; TRANSPORT

Reprint Address: Doweidar, H (reprint author), Mansoura Univ, Fac Sci, Dept Phys, Glass Res Grp, El Mansura 35516, Egypt.

Addresses:
[1] Mansoura Univ, Fac Sci, Dept Phys, Glass Res Grp, El Mansura 35516, Egypt

E-mail Address: hdoweidar@mans.edu.eg

Publisher: SPRINGER, 233 SPRING ST, NEW YORK, NY 10013 USA

Web of Science Categories: Materials Science, Multidisciplinary

Research Areas: Materials Science

IDS Number: 918IF

ISSN: 0022-2461

References:

1. Title: Thermoluminescent properties of a Li2O-B2O3-Al2O3 glass system doped with CaF2 and Mn
Author(s): Ayta, W. E. F.; Silva, V. A.; Dantas, N. O.
Source: JOURNAL OF LUMINESCENCE Volume: 130 Issue: 6 Pages: 1032-1035 DOI: 10.1016/j.jlumin.2010.01.020 Published: JUN 2010

2. Title: A SIMPLE SPIN-ECHO EXPERIMENT FOR ACCURATE MEASUREMENT OF CHEMICAL-SHIFTS IN SOLIDS - APPLICATION TO F-19 IN METAL DIFLUORIDES
Author(s): BODEN, N; KAHOL, PK; MEE, A; et al.
Source: JOURNAL OF MAGNETIC RESONANCE Volume: 54 Issue: 3 Pages: 419-426 DOI: 10.1016/0022-2364(83)90321-9 Abstract Number: A1984-007081 Published: 1983

3. Title: Structure of fluoride-containing bioactive glasses
Author(s): Brauer, Delia S.; Karpukhina, Natalia; Law, Robert V.; et al.
Source: JOURNAL OF MATERIALS CHEMISTRY Volume: 19 Issue: 31 Pages: 5629-5636 DOI: 10.1039/b900956f Published: 2009

4. Title: Density-structure correlations in fluoride-containing bioactive glasses
Author(s): Brauer, D. S.; Al-Noaman, A.; Hill, R. G.; et al.
Source: MATERIALS CHEMISTRY AND PHYSICS Volume: 130 Issue: 1-2 Pages: 121-125 DOI: 10.1016/j.matchemphys.2011.06.015 Published: OCT 17 2011

5. Title: Structural role of fluoride in the ion-conducting glass system B(2)O(3)-PbO-LiF studied by single- and double-resonance NMR
Author(s): Cattaneo, A. S.; Lima, R. P.; Tambelli, C. E.; et al.
Source: JOURNAL OF PHYSICAL CHEMISTRY C Volume: 112 Issue: 28 Pages: 10462-10471 DOI: 10.1021/jp800721e Published: JUL 17 2008

6. Title: STUDY OF THE FLUORINATED LITHIUM BORATE GLASSES
Author(s): CHOWDARI, BVR; RONG, Z
Source: SOLID STATE IONICS Volume: 78 Issue: 1-2 Pages: 133-142 DOI: 10.1016/0167-2738(95)00017-Z Abstract Number: A1995-19-6140D-009 Published: MAY 1995

7. Title: Effect of La2O3 on the structure of lead borate glasses
Author(s): Doweidar, H.; Saddeek, Yasser B.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 356 Issue: 28-30 Pages: 1452-1457 DOI: 10.1016/j.jnoncrysol.2010.04.036 Published: JUN 15 2010

8. Title: Density-structure correlations in Na2O-CaO-P2O5-SiO2 bioactive glasses
Author(s): Doweidar, H.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 355 Issue: 9 Pages: 577-580 DOI: 10.1016/j.jnoncrysol.2009.02.007 Published: APR 15 2009

9. Title: FTIR and ultrasonic investigations on modified bismuth borate glasses

Author(s): Doweidar, H.; Saddeek, Yasser B.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 355 Issue: 6 Pages: 348-354 DOI: 10.1016/j.jnoncrysol.2008.12.008 Published: MAR 1 2009

10. Title: Properties of Na2O-Al2O3-B2O3 glasses
Author(s): Doweidar, H; Moustafa, YM; Abd El-Maksoud, S; et al.
Source: MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING Volume: 301 Issue: 2 Pages: 207-212 DOI: 10.1016/S0921-5093(00)01786-X Abstract Number: A2001-08-6140D-004 Published: MAR 31 2001

11.Title: [not available]
Author(s): Doweidar, H; El-Egili, K; El-Damrawi, G; et al.
Source: Phys Chem Glasses Volume: 4 Issue: 9 Pages: 271 Published: 2008

12. Title: Density of lead borate glasses in relation to the microstructure
Author(s): Doweidar, H; Oraby, AH
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 38 Issue: 2 Pages: 69-73 Abstract Number: A1997-12-6140D-016 Published: APR 1997

13. Title: X-RAY PHOTOELECTRON-SPECTROSCOPY AND IONIC TRANSPORT STUDIES ON LEAD FLUOROBORATE GLASSES
Author(s): GOPALAKRISHNAN, R; TAN, KL; CHOWDARI, BVR; et al.
Source: JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 27 Issue: 12 Pages: 2612-2618 DOI: 10.1088/0022-3727/27/12/023 Abstract Number: A1995-04-6630H-004 Published: DEC 14 1994

14. Title: PROPERTIES AND STRUCTURE OF PBO-PBF2-B2O3 GLASSES
Author(s): GRESSLER, CA; SHELBY, JE
Source: JOURNAL OF APPLIED PHYSICS Volume: 66 Issue: 3 Pages: 1127-1131 DOI: 10.1063/1.343452 Abstract Number: A1989-121066 Published: AUG 1 1989

15. Title: LEAD FLUOROBORATE GLASSES
Author(s): GRESSLER, CA; SHELBY, JE
Source: JOURNAL OF APPLIED PHYSICS Volume: 64 Issue: 9 Pages: 4450-4453 DOI: 10.1063/1.341267 Abstract Number: A1989-029807 Published: NOV 1 1988

16. Title: Investigation of spectral absorption and elastic moduli of lithium haloborate glasses
Author(s): Hager, IZ; El-Hofy, M
Source: PHYSICA STATUS SOLIDI A-APPLIED RESEARCH Volume: 198 Issue: 1 Pages: 7-17 DOI: 10.1002/pssa.200305958 Abstract Number: A2004-04-8140J-025 Published: JUL 2003

17. Title: Optical properties of Eu2+-doped strontium borate glasses containing F- and Li+ ions
Author(s): Huang Yanlin; Jang Kiwan; Wang Xigang; et al.
Source: JOURNAL OF RARE EARTHS Volume: 26 Issue: 4 Pages: 490-494 DOI: 10.1016/S1002-0721(08)60124-6 Published: AUG 2008

18. Title: A REEXAMINATION OF STUDIES OF THE STRUCTURE OF NAF-NA2O-B2O3

GLASSES
Author(s): JAGER, C; HAUBENREISSER, U
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 26 Issue: 5 Pages: 152-156
Abstract Number: A1986-021399 Published: 1985

19. Title: THE MIXED ALKALI EFFECT IN LITHIUM SODIUM-BORATE GLASSES
Author(s): JAIN, H; DOWNING, HL; PETERSON, NL
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 64 Issue: 3 Pages: 335-349
DOI: 10.1016/0022-3093(84)90187-X Abstract Number: A1984-084449 Published: 1984

20. Title: INFRARED REFLECTANCE SPECTRA OF LITHIUM BORATE GLASSES
Author(s): KAMITSOS, EI; PATSIS, AP; KARAKASSIDES, MA; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 126 Issue: 1-2 Pages: 52-67 DOI: 10.1016/0022-3093(90)91023-K Abstract Number: A1991-030079 Published: DEC 1990

21. Title: VIBRATIONAL-SPECTRA OF MAGNESIUM-SODIUM-BORATE GLASSES .2. RAMAN AND MIDINFRARED INVESTIGATION OF THE NETWORK STRUCTURE
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: JOURNAL OF PHYSICAL CHEMISTRY Volume: 91 Issue: 5 Pages: 1073-1079
DOI: 10.1021/j100289a014 Abstract Number: A1987-077540 Published: FEB 26 1987

22. Title: A VIBRATIONAL STUDY OF LITHIUM BORATE GLASSES WITH HIGH LI2O CONTENT
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 28 Issue: 5 Pages: 203-209
Abstract Number: A1988-044826 Published: OCT 1987

23. Title: A SPECTROSCOPIC STUDY OF FLUORIDE CONTAINING SODIUM-BORATE GLASSES
Author(s): KAMITSOS, EI; KARAKASSIDES, MA
Source: SOLID STATE IONICS Volume: 28 Pages: 783-787 DOI: 10.1016/S0167-2738(88)80146-2 Part: Part 1 Abstract Number: A1989-049630 Published: SEP 1988

24.Title: [not available]
Author(s): Kittel, C.
Source: Introduction to Solid State Physics Published: 1996
Publisher: Wiley, New York

25. Title: NUCLEAR MAGNETIC RESONANCE INVESTIGATIONS OF STRUCTURE OF GLASSES IN SYSTEM NAF-NA2O-B2O3
Author(s): KLINE, D; BRAY, PJ
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 7 Issue: 2 Pages: 41-&
Abstract Number: A1966-20791 Published: 1966

26.Title: [not available]
Editor(s): Leide, DR.
Source: CRC HDB CHEM PHYS Published: 2005

Publisher: CRC Press, Boca Raton

27. Title: CRYSTALLINE COMPOUNDS AND GLASSES IN SYSTEM B2O3-NAF-NABF4
Author(s): MAYA, L
Source: JOURNAL OF THE AMERICAN CERAMIC SOCIETY Volume: 60 Issue: 7-8 Pages: 323-328 DOI: 10.1111/j.1151-2916.1977.tb15552.x Abstract Number: A1978-011210 Published: 1977

28.Title: UTILIZATION OF INFRARED-SPECTROSCOPY TO DETERMINE THE FRACTION OF THE 4 COORDINATED BORONS IN BORATE GLASSES
Author(s): MOUSTAFA, YM; DOWEIDAR, H; ELDAMRAWI, GSource: PHYSICS AND CHEMISTRY OF GLASSES Volume: 35 Issue: 2 Pages: 104-106 Abstract Number: A1994-11-6140D-009 Published: APR 1994

29. Title: Infrared spectra of sodium phosphate glasses
Author(s): Moustafa, YM; El-Egili, K
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 240 Issue: 1-3 Pages: 144-153 DOI: 10.1016/S0022-3093(98)00711-X Abstract Number: A1999-03-7830-009 Published: OCT 1998

30. Title: Short-range structure of alkaline-earth borate glasses by pulsed neutron diffraction and molecular dynamics simulation
Author(s): Ohtori, N; Takase, K; Akiyama, I; et al.
Conference: 8th International Conference on the Structure on Non-Crystalline Materials (NCM 8) Location: UNIV WALES, ABERYSTWYTH, WALES Date: AUG 06-11, 2000
Sponsor(s): Corning Glass; British Nucl Fuels plc; Pilkington plc; Soc Glass Technol
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 293 Pages: 136-145 DOI: 10.1016/S0022-3093(01)00662-7 Published: NOV 2001

31. Title: Electric Conductivity of Fluorine-Containing Sodium Borate. Glasses
Author(s): Pronkin, A.A.; Naraev, V.N.; Eliseev, S.Yu.
Source: Fiz. Khim. Stekla Volume: 14 Issue: 6 Pages: 926-928 Published: 1988

32.Title: [not available]
Author(s): PRONKIN AA
Source: SOV J GLASS PHYS CH Volume: 18 Pages: 304 Published: 1992

33. Title: Effect of phase separation on the properties of simple glasses. I. Density and molar volume
Author(s): Shaw, R.R.; Uhlmann, D.R.
Source: Journal of Non-Crystalline Solids Volume: 1 Issue: 6 Pages: 474-98 DOI: 10.1016/0022-3093(69)90009-X Abstract Number: A1970-027623 Published: Nov. 1969

34. Title: Alkali fluoroborate glasses
Author(s): Shelby, JE; Baker, LD
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 39 Issue: 1 Pages: 23-28 Abstract Number: A1998-05-6140D-019 Published: FEB 1998

35. Title: PROPERTIES AND STRUCTURE OF NAF-NA2O-B2O3 GLASSES
Author(s): SHELBY, JE; ORTOLANO, RL
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 31 Issue: 1 Pages: 25-29
Abstract Number: A1990-088734 Published: FEB 1990

36. Title: PROPERTIES AND STRUCTURE OF SODIUM FLUOROBORATE GLASSES
Author(s): SHELBY, JE; DOWNIE, LK
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 30 Issue: 4 Pages: 151-154
Published: AUG 1989

37. Title: On the nature of current carriers in glasses of the NaF-Na2O-B2O3 system
Author(s): Sokolov, IA; Naraev, VN; Nosakin, AN; et al.
Source: GLASS PHYSICS AND CHEMISTRY Volume: 26 Issue: 6 Pages: 584-587 DOI: 10.1023/A:1007156332120 Published: NOV-DEC 2000

38. Title: Influence of MeF2 (Me = Mg, Ca, Sr, and Ba) on the electrical properties of glasses in the MeF2-Na2B4O7 system
Author(s): Sokolov, IA; Naraev, VN; Nosakin, AN; et al.
Conference: International Conference on Glasses and Solid Electrolytes Location: ST PETERSBURG, RUSSIA Date: MAY 17-19, 1999
Source: GLASS PHYSICS AND CHEMISTRY Volume: 26 Issue: 4 Pages: 383-389
Published: JUL-AUG 2000

39.Title: Density and ultrasonic velocities in fast ionic conducting borate glasses
Author(s): Souto, S; Massot, M; Balkanski, M; et al.
Source: MATERIALS SCIENCE AND ENGINEERING B-SOLID STATE MATERIALS FOR ADVANCED TECHNOLOGY Volume: 64 Issue: 1 Pages: 33-38 DOI: 10.1016/S0921-5107(99)00150-6 Abstract Number: A1999-23-6265-002 Published: SEP 15 1999

40. Title: Spectroscopic and transport studies of Cu2+ doped in (30-x)Na2O-xNaF-50B(2)O(3)-20Bi(2)O(3) glass system
Author(s): Suresh, SS; Chandramouli, V
Source: INDIAN JOURNAL OF PURE & APPLIED PHYSICS Volume: 42 Issue: 8 Pages: 560-564 Abstract Number: A2005-06-6140D-010 Published: AUG 2004

41. Title: X-RAY PHOTOELECTRON SPECTROSCOPIC STUDY OF LEAD FLUOROBORATE GLASSES
Author(s): WANG, Y; OSAKA, A; MIURA, Y; et al.
Source: JOURNAL OF MATERIALS SCIENCE LETTERS Volume: 8 Issue: 4 Pages: 421-423 DOI: 10.1007/BF00720693 Published: APR 1989

42.Title: [not available]
Author(s): Watanabe, T.; Hayashi, M.; Hayashi, S.; et al.
Conference: VII International Conference on Molten Slags Fluxes and Salts Location: Johannesburg Date: 2004
Sponsor(s): The South African Institute of Mining and Metallurgy

Source: 7 INT C MOLT SLAGS F Pages: 699-706 Published: 2004

43. Title: Structure and properties of alkaline earth borate glasses
Author(s): Yiannopoulos, YD; Chryssikos, GD; Kamitsos, EI
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 42 Issue: 3 Pages: 164-172
Abstract Number: A2002-01-7830-023 Published: JUN 2001

Structural role of MgO and PbO in MgO-PbO-B2O3 glasses as revealed by FTIR; a new approach

Author(s): Doweidar, H (Doweidar, H.)[1] ; El-Damrawi, G (El-Damrawi, G.)[1] ; Mansour, E (Mansour, E.)[2] ; Fetouh, RE (Fetouh, R. E.)[1]

Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 358 Issue: 5 Pages: 941-946 DOI: 10.1016/j.jnoncrysol.2012.01.004 Published: MAR 1 2012

Abstract:
FTIR spectra of three MgO-PbO-B2O3 glass series have been analyzed. There is a decrease in the fraction N-4 of four coordinated boron with increasing the MgO content, at the expense of PbO. A new technique has been presented to make use of the N-4 data and follow the change in the modifier and former fractions of PbO and MgO. These fractions change markedly, at different rates, with the glass composition. The fraction of modifier MgO is always less than the MgO content, which suggests a former role of this oxide in the studied glasses. The ability of the glass to include MgO increases with increasing PbO content. (C) 2012 Elsevier B.V. All rights reserved.

Accession Number: WOS:000302664800012

Document Type: Article

Language: English

Author Keywords: PbO-B2O3 glasses; MgO-B2O3 glasses; MgO-PbO-B2O3 glasses; FTIR analysis; Infrared spectra

KeyWords Plus: LEAD BORATE GLASSES; NUCLEAR MAGNETIC-RESONANCE; CATION-SITE INTERACTIONS; VIBRATIONAL-SPECTRA; PHOSPHATE-GLASSES; SILICATE-GLASSES; BORON-OXIDE; DENSITY; SYSTEM; MGO-AL2O3-B2O3

Reprint Address: Doweidar, H (reprint author), Mansoura Univ, Fac Sci, Glass Res Grp, Dept Phys, Mansoura 35516, Egypt.

Addresses:
[1] Mansoura Univ, Fac Sci, Glass Res Grp, Dept Phys, Mansoura 35516, Egypt
[2] Beni Suef Univ, Dept Essential Sci, Ind Educ Coll, Bani Suwayf, Egypt

E-mail Address: hdoweidar@mans.edu.eg

Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS

Web of Science Categories: Materials Science, Ceramics; Materials Science, Multidisciplinary

Research Areas: Materials Science

IDS Number: 924BE

ISSN: 0022-3093

References:

1. Title: Density-structure correlations in fluoride-containing bioactive glasses
Author(s): Brauer, D. S.; Al-Noaman, A.; Hill, R. G.; et al.
Source: MATERIALS CHEMISTRY AND PHYSICS Volume: 130 Issue: 1-2 Pages: 121-125 DOI: 10.1016/j.matchemphys.2011.06.015 Published: OCT 17 2011

2. Title: Nuclear magnetic resonance investigations of the structure of lead borate glasses
Author(s): Bray, P.J.; Leventhal, M.; Hooper, H.O.
Source: Physics and Chemistry of Glasses Volume: 4 Issue: 2 Pages: 47-66 Abstract Number: A1963-18148 Published: 04 1963

3. Title: THE DETERMINATION OF PHASE-RELATIONS IN THE SYSTEM MGO-B2O3 AT THE METABORATE COMPOSITION USING B-11 NMR
Author(s): DELL, WJ; BRAY, PJ
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 23 Issue: 4 Pages: 98-100 Abstract Number: A1982-098247 Published: 1982

4. Title: CONSIDERATION OF THE BORON-OXIDE ANOMALY
Author(s): DOWEIDAR, H
Source: JOURNAL OF MATERIALS SCIENCE Volume: 25 Issue: 1A Pages: 253-258 DOI: 10.1007/BF00544216 Abstract Number: A1990-054099 Published: JAN 1990

5. Title: Effect of La2O3 on the structure of lead borate glasses
Author(s): Doweidar, H.; Saddeek, Yasser B.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 356 Issue: 28-30 Pages: 1452-1457 DOI: 10.1016/j.jnoncrysol.2010.04.036 Published: JUN 15 2010

6. Title: Optical properties in correlation with the structure of silicate glasses
Author(s): Doweidar, H; El Damrawi, GM; El-Maksoud, SA
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 43 Issue: 1 Pages: 52-58 Abstract Number: A2002-16-7820D-008 Published: FEB 2002

7. Title: Modelling of density structure relations in silicate glasses containing Al2O3
Author(s): Doweidar, H
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 42 Issue: 1 Pages: 42-48 Abstract Number: A2001-10-6140D-008 Published: FEB 2001

8. Title: Density of lead borate glasses in relation to the microstructure
Author(s): Doweidar, H; Oraby, AH
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 38 Issue: 2 Pages: 69-73 Abstract Number: A1997-12-6140D-016 Published: APR 1997

9. Title: Sites distribution and properties of Al(2)O(3)-PbO-B(2)O(3) glasses
Author(s): Doweidar, H.; El-Egili, K.; El-Damrawi, G.; et al.
Source: PHYSICS AND CHEMISTRY OF GLASSES-EUROPEAN JOURNAL OF GLASS

SCIENCE AND TECHNOLOGY PART B Volume: 49 Issue: 5 Pages: 271-277 Published: OCT 2008

10. Title: Vitrification and devitrification phenomena in the ternary MgO-Al2O3-B2O3 system
Author(s): Hamzawy, Esmat M. A.; Darwish, Hussein
Source: CERAMICS INTERNATIONAL Volume: 34 Issue: 8 Pages: 1965-1969 DOI: 10.1016/j.ceramint.2007.07.015 Published: DEC 2008

11. Title: INFRARED REFLECTANCE SPECTRA OF LITHIUM BORATE GLASSES
Author(s): KAMITSOS, EI; PATSIS, AP; KARAKASSIDES, MA; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 126 Issue: 1-2 Pages: 52-67 DOI: 10.1016/0022-3093(90)91023-K Abstract Number: A1991-030079 Published: DEC 1990

12. Title: VIBRATIONAL-SPECTRA OF MAGNESIUM-SODIUM-BORATE GLASSES .1. FAR-INFRARED INVESTIGATION OF THE CATION-SITE INTERACTIONS
Author(s): KAMITSOS, EI; CHRYSSIKOS, GD; KARAKASSIDES, MA
Source: JOURNAL OF PHYSICAL CHEMISTRY Volume: 91 Issue: 5 Pages: 1067-1073 DOI: 10.1021/j100289a013 Abstract Number: A1987-076011 Published: FEB 26 1987

13. Title: VIBRATIONAL-SPECTRA OF MAGNESIUM-SODIUM-BORATE GLASSES .2. RAMAN AND MIDINFRARED INVESTIGATION OF THE NETWORK STRUCTURE
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: JOURNAL OF PHYSICAL CHEMISTRY Volume: 91 Issue: 5 Pages: 1073-1079 DOI: 10.1021/j100289a014 Abstract Number: A1987-077540 Published: FEB 26 1987

14. Title: A VIBRATIONAL STUDY OF LITHIUM BORATE GLASSES WITH HIGH LI2O CONTENT
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 28 Issue: 5 Pages: 203-209 Abstract Number: A1988-044826 Published: OCT 1987

15. Title: Preparation and infrared study of magnesium borate gels with a wide composition range
Author(s): Karakassides, MA; Petridis, D; Mousdis, G; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 202 Issue: 1-2 Pages: 198-202 DOI: 10.1016/0022-3093(96)00519-4 Published: JUL 1996

16. Title: NUCLEAR MAGNETIC-RESONANCE STUDIES OF GLASSES IN SYSTEM PBO-B-2O-3-SIO-2
Author(s): KIM, KS; BRAY, PJ; MERRIN, S
Source: JOURNAL OF CHEMICAL PHYSICS Volume: 64 Issue: 11 Pages: 4459-4465 DOI: 10.1063/1.432125 Abstract Number: A1976-069149 Published: 1976

17. Title: Thermal expansion and transition temperature of glasses in the systems BeO-Al2O3-B2O3 and MgO-Al2O3-B2O3

Author(s): Klyuev, V. P.; Pevzner, B. Z.
Conference: 10th International Conference on the Structure of Non-Crystalline Materials (NCM 10) Location: Prague, CZECH REPUBLIC Date: SEP 18-22, 2006
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 353 Issue: 18-21 Pages: 2008-2013 DOI: 10.1016/j.jnoncrysol.2007.01.065 Published: JUN 15 2007

18. Title: Glass formation at the limit of insufficient network formers
Author(s): Kohara, S; Suzuya, K; Takeuchi, K; et al.
Source: SCIENCE Volume: 303 Issue: 5664 Pages: 1649-1652 DOI: 10.1126/science.1095047 Abstract Number: A2004-09-6470P-010 Published: MAR 12 2004

19. Title: INTERPRETATION OF INFRA-RED SPECTRA OF BORON OXIDE AND ALKALI BORATE GLASSES
Author(s): KROGHMOE, J
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 6 Issue: 2 Pages: 46-& Published: 1965

20. Title: NUCLEAR MAGNETIC RESONANCE INVESTIGATIONS OF COMPOUNDS AND GLASSES IN SYSTEMS PBO-B2O3 AND PBO-SIO2
Author(s): LEVENTHA.M; BRAY, PJ
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 6 Issue: 4 Pages: 113-& Abstract Number: A1965-30366 Published: 1965

21. Title: Physical properties of alkaline-earth and alkali borate glasses prepared over an extended range of compositions
Author(s): Lower, NP; McRae, JL; Feller, HA; et al.
Conference: 8th International Conference on the Structure on Non-Crystalline Materials (NCM 8) Location: UNIV WALES, ABERYSTWYTH, WALES Date: AUG 06-11, 2000
Sponsor(s): Corning Glass; British Nucl Fuels plc; Pilkington plc; Soc Glass Technol
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 293 Pages: 669-675 DOI: 10.1016/S0022-3093(01)00768-2 Abstract Number: A2002-03-6470P-006 Published: NOV 2001

22. Title: [not available]
Author(s): Mansour, E.S.; El-Damrawi, G.; Fetoh, R.E.; et al.
Source: Eur. Phys. J. B Volume: 83 Pages: 133

23. Title: Structure and dynamics of phosphate glasses
Author(s): Matic, A; Borjesson, L
Conference: 6th International Workshop on Disordered Systems Location: ANDALO, ITALY Date: MAR 03-06, 1997
Sponsor(s): Univ Trento, Dipartiemento Fis; Grp Nazl Struttura Mat; Consiglio Nazl Ric; Cassa Risparmio Trento & Rovereto
Source: PHILOSOPHICAL MAGAZINE B-PHYSICS OF CONDENSED MATTER STATISTICAL MECHANICS ELECTRONIC OPTICAL AND MAGNETIC PROPERTIES Volume: 77 Issue: 2 Pages: 357-362 DOI: 10.1080/13642819808204962 Abstract Number:

A1998-07-6140D-015 Published: FEB 1998

24. Title: RAMAN-STUDY OF LEAD BORATE GLASSES
Author(s): MEERA, BN; SOOD, AK; CHANDRABHAS, N; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 126 Issue: 3 Pages: 224-230 DOI: 10.1016/0022-3093(90)90823-5 Abstract Number: A1991-042215 Published: DEC 1990

25. Title: Copper redox behavior, structure and properties of copper lead borate glasses
Author(s): Metwalli, E
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 317 Issue: 3 Pages: 221-230 Article Number: PII S0022-3093(02)01853-7 DOI: 10.1016/S0022-3093(02)01853-7 Abstract Number: A2003-13-6140D-049 Published: MAR 2003

26.Title: UTILIZATION OF INFRARED-SPECTROSCOPY TO DETERMINE THE RACTION OF THE 4 COORDINATED BORONS IN BORATE GLASSES
Author(s): MOUSTAFA, YM; DOWEIDAR, H; ELDAMRAWI, G
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 35 Issue: 2 Pages: 104-106 Abstract Number: A1994-11-6140D-009 Published: APR 1994

27. Title: VIBRATIONAL SPECTROSCOPY OF CATION-SITE INTERACTIONS IN PHOSPHATE-GLASSES
Author(s): NELSON, BN; EXARHOS, GJ
Source: JOURNAL OF CHEMICAL PHYSICS Volume: 71 Issue: 7 Pages: 2739-2747 DOI: 10.1063/1.438679 Abstract Number: A1980-002744 Published: 1979

28. Title: Evaluation of the fraction of fourfold-coordinated boron in oxide glasses from their composition
Author(s): Priven, AI
Source: GLASS PHYSICS AND CHEMISTRY Volume: 26 Issue: 5 Pages: 441-454 Published: SEP-OCT 2000

29.Title: [not available]
Author(s): Rohrer, G. S.
Source: Structure and Bonding in Crystalline Materials Published: 2004
Publisher: Cambridge Univ. Press, Cambridge

30. Title: MIXED ALKALI GLASS SPECTRA AND STRUCTURE
Author(s): ROUSE, GB; MILLER, PJ; RISEN, WM
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 28 Issue: 2 Pages: 193-207 DOI: 10.1016/0022-3093(78)90006-6 Abstract Number: A1978-060435 Published: 1978

31. Title: Structure-property correlations in Y-Ca-Mg-sialon glasses: Physical and mechanical properties
Author(s): Rouxel, T; Dely, N; Sangleboeuf, JC; et al.
Source: JOURNAL OF THE AMERICAN CERAMIC SOCIETY Volume: 88 Issue: 4

Pages: 889-896 DOI: 10.1111/j.1551-2916.2005.00146.x Abstract Number: A2005-15-6140D-005 Published: APR 2005

32. Title: Structural study of PbO-B2O3 classes by X-ray diffraction and B-11 MAS NMR techniques
Author(s): Takaishi, T; Jin, JS; Uchino, T; et al.
Source: JOURNAL OF THE AMERICAN CERAMIC SOCIETY Volume: 83 Issue: 10 Pages: 2543-2548 Abstract Number: A2001-03-6140D-004 Published: OCT 2000

Density-structure correlations in fluoride-containing bioactive glasses

Author(s): Brauer, DS (Brauer, D. S.)[1]; Al-Noaman, A (Al-Noaman, A.)[1]; Hill, RG (Hill, R. G.)[1]; Doweidar, H (Doweidar, H.)[2]

Source: MATERIALS CHEMISTRY AND PHYSICS Volume: 130 Issue: 1-2 Pages: 121-125 DOI: 10.1016/j.matchemphys.2011.06.015 Published: OCT 17 2011

Abstract:
Fluoride-containing bioactive glasses are of interest for dental and orthopaedic applications. On the basis of MAS NMR results, a model has been developed for the density and molar volume of SiO(2)-P(2)O(5)-CaO-Na(2)O-CaF(2) bioactive glasses. The model correlates the density with the concentration and volume of the structural units forming the glass. CaF(2) is assumed to be present in glass in the form of CaF(4) units; the volume of CaF(4) in the studied glasses is about 1.02% greater than in the CaF(2) crystal. Calculated density and molar volume are consistent with the experimental data and the good agreement between calculated and measured density provides validation of the presence of F-Ca(n) units from (19)F MAS NMR studies. Because of constant network connectivity of the silicate network, the increase in both the density and molar volume is related only to the increase in the concentration of CaF(4) units.

Accession Number: WOS:000295601700020

Document Type: Article

Language: English

Author Keywords: Biomaterials; Glasses; Amorphous materials; Ceramics

KeyWords Plus: LIME PHOSPHOSILICATE GLASSES; ALKALI SILICATE-GLASSES; P2O5 CONTENT; SI-29 NMR; 2 SERIES; F-19; DEGRADATION; DENTIFRICE; CERAMICS; CAF2

Reprint Address: Brauer, DS (reprint author), Queen Mary Univ London, Unit Dent Phys Sci, Barts & London Sch Med & Dent, Mile End Rd, London E1 4NS, England.

Addresses:
[1] Queen Mary Univ London, Unit Dent Phys Sci, Barts & London Sch Med & Dent, London E1 4NS, England
[2] Mansoura Univ, Fac Sci, Dept Phys, Glass Res Grp, Mansoura 35516, Egypt

E-mail Address: d.brauer@qmul.ac.uk

Publisher: ELSEVIER SCIENCE SA, PO BOX 564, 1001 LAUSANNE, SWITZERLAND

Web of Science Categories: Materials Science, Multidisciplinary

Research Areas: Materials Science

IDS Number: 829RJ

ISSN: 0254-0584

References:

1. Title: Fluoride-containing bioactive glasses inhibit pentose phosphate oxidative pathway and glucose 6-phosphate dehydrogenase activity in human osteoblasts
Author(s): Bergandi, Loredana; Aina, Valentina; Garetto, Stefano; et al.
Source: CHEMICO-BIOLOGICAL INTERACTIONS Volume: 183 Issue: 3 Pages: 405-415 DOI: 10.1016/j.cbi.2009.11.021 Published: FEB 12 2010

2. Title: A SIMPLE SPIN-ECHO EXPERIMENT FOR ACCURATE MEASUREMENT OF CHEMICAL-SHIFTS IN SOLIDS - APPLICATION TO F-19 IN METAL DIFLUORIDES
Author(s): BODEN, N; KAHOL, PK; MEE, A; et al.
Source: JOURNAL OF MAGNETIC RESONANCE Volume: 54 Issue: 3 Pages: 419-426 DOI: 10.1016/0022-2364(83)90321-9 Abstract Number: A1984-007081 Published: 1983

3. Title: Fluoride-containing bioactive glasses: Effect of glass design and structure on degradation, pH and apatite formation in simulated body fluid
Author(s): Brauer, Delia S.; Karpulthina, Natalia; O'Donnell, Matthew D.; et al.
Source: ACTA BIOMATERIALIA Volume: 6 Issue: 8 Pages: 3275-3282 DOI: 10.1016/j.actbio.2010.01.043 Published: AUG 2010

4. Title: Structure of fluoride-containing bioactive glasses
Author(s): Brauer, Delia S.; Karpukhina, Natalia; Law, Robert V.; et al.
Source: JOURNAL OF MATERIALS CHEMISTRY Volume: 19 Issue: 31 Pages: 5629-5636 DOI: 10.1039/b900956f Published: 2009

5. Title: Size of CaF(2) crystals precipitated from glasses in the Na(2)O/K(2)O/CaO/CaF(2)/Al(2)O(3)/SiO(2) system and percolation theory
Author(s): de Almeida, Romulo Petrini Fogaca; Bocker, Christian; Ruessel, Christian
Source: CHEMISTRY OF MATERIALS Volume: 20 Issue: 18 Pages: 5916-5921 DOI: 10.1021/cm801426u Published: SEP 23 2008

6. Title: Density-structure correlations in Na2O-CaO-P2O5-SiO2 bioactive glasses
Author(s): Doweidar, H.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 355 Issue: 9 Pages: 577-580 DOI: 10.1016/j.jnoncrysol.2009.02.007 Published: APR 15 2009

7. Title: Density-structure correlations in silicate glasses
Author(s): Doweidar, H
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 249 Issue: 2-3 Pages: 194-200 DOI: 10.1016/S0022-3093(99)00310-5 Abstract Number: A1999-20-6140D-011 Published: JUL 1999

8. Title: The density of alkali silicate glasses in relation to the microstructure
Author(s): Doweidar, H
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 194 Issue: 1-2 Pages: 155-162 DOI: 10.1016/0022-3093(95)00489-0 Abstract Number: A1996-05-6140D-008 Published: JAN 1996

9. Title: A MAS-NMR INVESTIGATION OF LITHIUM SILICATE-GLASSES AND GLASS-CERAMICS
Author(s): DUPREE, R; HOLLAND, D; MORTUZA, MG
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 116 Issue: 2-3 Pages: 148-160 DOI: 10.1016/0022-3093(90)90687-H Abstract Number: A1990-090403 Published: FEB 1990

10. Title: Structural analysis of bioactive glasses
Author(s): Elgayar, I; Aliev, AE; Boccaccini, AR; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 351 Issue: 2 Pages: 173-183 DOI: 10.1016/j.jnoncrysol.2004.07.067 Published: JAN 15 2005

11. Title: HIGH-FIELD SI-29 NMR-STUDIES OF ALKALI SILICATE-GLASSES
Author(s): EMERSON, JF; STALLWORTH, PE; BRAY, PJ
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 113 Issue: 2-3 Pages: 253-259 DOI: 10.1016/0022-3093(89)90019-7 Abstract Number: A1990-062962 Published: DEC 1989

12. Title: Prevention and reversal of dental caries: role of low level fluoride
Author(s): Featherstone, JDB
Conference: Consensus Conference of the Canadian-Dental-Association Location: TORONTO, CANADA Date: NOV 28-29, 1997
Sponsor(s): Canadian Dent Assoc
Source: COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY Volume: 27 Issue: 1 Pages: 31-40 DOI: 10.1111/j.1600-0528.1999.tb01989.x Published: FEB 1999

13. Title: The effects of a novel Bioglass (R) dentifrice on dentine sensitivity: a scanning electron microscopy investigation
Author(s): Gillam, DG; Tang, JY; Mordan, NJ; et al.
Source: JOURNAL OF ORAL REHABILITATION Volume: 29 Issue: 4 Pages: 305-313 DOI: 10.1046/j.1365-2842.2002.00824.x Published: APR 2002

14. Title: An x-ray photoelectron spectroscopic study of the chemical states of fluorine atoms in calcium silicate glasses
Author(s): Hayakawa, S; Nakao, A; Ohtsutki, C; et al.
Source: JOURNAL OF MATERIALS RESEARCH Volume: 13 Issue: 3 Pages: 739-743 DOI: 10.1557/JMR.1998.0093 Abstract Number: A1998-15-7960-003 Published: MAR 1998

15. Title: Effect of Na2O on crystallization of mould fluxes for continuous casting of steel
Author(s): Hayashi, Miyuki; Watanabe, Takashi; Nakada, Hideko; et al.
Conference: 12th ISIJ-VDEh Seminar Location: Kitakyushu, JAPAN Date: NOV 21-22, 2005
Sponsor(s): Iron & Steel Inst Japan; VDEh
Source: ISIJ INTERNATIONAL Volume: 46 Issue: 12 Pages: 1805-1809 DOI: 10.2355/isijinternational.46.1805 Published: 2006

16. Title: Direct chemical bond of bioactive glass-ceramic materials to bone and muscle.
Author(s): Hench, L L; Paschall, H A
Source: Journal of biomedical materials research Volume: 7 Issue: 3 Pages: 25-42 DOI: 10.1002/jbm.820070304 Published: 1973

17. Title: 4775646
Patent Number: US 4775646
Inventor/Assignee: HENCH LL

18. Title: An alternative view of the degradation of bioglass
Author(s): Hill, R
Source: JOURNAL OF MATERIALS SCIENCE LETTERS Volume: 15 Issue: 13 Pages: 1122-1125 DOI: 10.1007/BF00539955 Abstract Number: A1996-18-8770J-001 Published: JUL 1 1996

19. Title: Characterisation of fluorine containing glasses and glass-ceramics by F-19 magic angle spinning nuclear magnetic resonance spectroscopy
Author(s): Hill, R. G.; Law, R. V.; O'Donnell, M. D.; et al.
Source: JOURNAL OF THE EUROPEAN CERAMIC SOCIETY Volume: 29 Issue: 11 Pages: 2185-2191 DOI: 10.1016/j.jeurceramsoc.2009.01.009 Published: AUG 2009

20. Title: Fluoride-containing bioactive glasses: Surface reactivity in simulated body fluids solutions
Author(s): Lusvardi, G.; Malavasi, G.; Menabue, L.; et al.
Source: ACTA BIOMATERIALIA Volume: 5 Issue: 9 Pages: 3548-3562 DOI: 10.1016/j.actbio.2009.06.009 Published: NOV 2009

21 Title: Elucidation of the structural role of fluorine in potentially bioactive glasses by experimental and computational investigation
Author(s): Lusvardi, G.; Malavasi, G.; Cortada, M.; et al.
Source: JOURNAL OF PHYSICAL CHEMISTRY B Volume: 112 Issue: 40 Pages: 12730-12739 DOI: 10.1021/jp803031z Published: OCT 9 2008

22. Title: High phosphate content significantly increases apatite formation of fluoride-containing bioactive glasses
Author(s): Mneimne, Mohammed; Hill, Robert G.; Bushby, Andrew J.; et al.
Source: ACTA BIOMATERIALIA Volume: 7 Issue: 4 Pages: 1827-1834 DOI: 10.1016/j.actbio.2010.11.037 Published: APR 2011

23. Title: Effect of P2O5 content in two series of soda lime phosphosilicate glasses on structure and properties - Part I: NMR
Author(s): O'Donnell, M. D.; Watts, S. J.; Law, R. V.; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 30 Pages: 3554-3560 DOI: 10.1016/j.jnoncrysol.2008.03.034 Published: JUL 15 2008

24. Title: Effect of P2O5 content in two series of soda lime phosphosilicate glasses on structure and properties - Part II: Physical properties
Author(s): O'Donnell, M. D.; Watts, S. J.; Law, R. V.; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 30 Pages: 3561-3566 DOI: 10.1016/j.jnoncrysol.2008.03.035 Published: JUL 15 2008

25. Title: [not available]
Author(s): PEDONE A
Source: CHEM MATER Volume: 19 Pages: 5644 Published: 2010

26. Title: Nanocrystallization of CaF2 from Na2O/K2O/CaO/CaF2/Al2O3/SiO2 glasses
Author(s): Russel, C
Source: CHEMISTRY OF MATERIALS Volume: 17 Issue: 23 Pages: 5843-5847 DOI: 10.1021/cm051430x Published: NOV 15 2005

27. Title: SI-29 MAGIC ANGLE SPINNING NMR-STUDY ON LOCAL SILICON ENVIRONMENTS IN AMORPHOUS AND CRYSTALLINE LITHIUM SILICATES
Author(s): SCHRAMM, CM; DEJONG, BHWS; PARZIALE, VE
Source: JOURNAL OF THE AMERICAN CHEMICAL SOCIETY Volume: 106 Issue: 16 Pages: 4396-4402 Abstract Number: A1985-033875 Published: 1984

28. Title: Cation ordering at fluoride sites in silicate glasses: a high-resolution F-19 NMR study
Author(s): Stebbins, JF; Zeng, Q
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 262 Issue: 1-3 Pages: 1-5 DOI: 10.1016/S0022-3093(99)00695-X Abstract Number: A2000-07-7660-001 Published: FEB 2000

29. Title: Identification of multiple structural species in silicate glasses by 29Si NMR.
Author(s): Stebbins, J F
Source: Nature Volume: 330 Issue: 6147 Pages: 465-7 DOI: 10.1038/330465a0 Abstract Number: A1988-032567 Published: 1987 Dec 3-9

30. Title: Anti-gingivitis effect of a dentifrice containing bioactive glass (NovaMin (R)) particulate
Author(s): Tai, BJ; Bian, Z; Jiang, H; et al.
Source: JOURNAL OF CLINICAL PERIODONTOLOGY Volume: 33 Issue: 2 Pages: 86-91 DOI: 10.1111/j.1600.051X.2005.00879.x Published: FEB 2006

31.Title: [not available]
Author(s): WATANABE T
Source: SOLID STATE F 19 NMR Pages: 699 Published: 2004

Structure-properties changes in ZnO-PbO-GeO2 glasses

Author(s): Mansour, E (Mansour, E.)[1]; El-Damrawi, G (El-Damrawi, G.)[2]; Fetoh, RE (Fetoh, R. E.)[2]; Doweidar, H (Doweidar, H.)[2]

Source: EUROPEAN PHYSICAL JOURNAL B Volume: 83 Issue: 2 Pages: 133-141 DOI: 10.1140/epjb/e2011-20211-2 Published: SEP 2011

Abstract: We have studied the structure of ZnO-PbO-GeO2 glasses by Fourier transform infrared spectroscopy and showed that the analysis of the vibrational spectra can lead to a quantitative description of the network structure in terms of the fraction of the local germanate polyhedra. The presence of GeO4, GeO6 and GeO4 with NBOs units was evidenced in the studied glass network. The initial additions of ZnO would introduce modifier Zn2+ ions at the expense of the former PbO4 units. With increasing ZnO content, ZnO4 tetrahedra would mainly replace modifier PbO. The decrease in density when introducing ZnO at the expense of PbO content is not only due to the vast difference in molecular mass between PbO and ZnO, but also due to the formation of Q(2) and Q(3) units. The glass network of the investigated glasses posseses a more covalent character upon replacing ZnO for PbO. This is the reason for increasing the microhardness and the glass transformation temperature of the glasses investigated with increasing zinc oxide content. The change in the conductivity at certain temperature not only attributed to the change in the covalency of the glass matrix upon replacing PbO by ZnO but also due to a change in the strain energy because of the change in V-m.

Accession Number: WOS:000296633500002

Document Type: Article

Language: English

KeyWords Plus: BISMUTH-GERMANATE GLASSES; LITHIUM BORATE GLASSES; VIBRATIONAL SPECTROSCOPY; PHYSICAL-PROPERTIES; PHOSPHATE-GLASSES; IR SPECTROSCOPY; RANGE ORDER; X-RAY; SYSTEM; RAMAN

Reprint Address: Mansour, E (reprint author), Beni Suef Univ, Dept Essential Sci, Ind Educ Coll, Bani Suwayf, Egypt.

Addresses:
[1] Beni Suef Univ, Dept Essential Sci, Ind Educ Coll, Bani Suwayf, Egypt
[2] Mansoura Univ, Fac Sci, Glass Res Grp, Dept Phys, Mansoura 35516, Egypt

E-mail Address: emansour68@gmail.com

Publisher: SPRINGER, 233 SPRING ST, NEW YORK, NY 10013 USA

Web of Science Categories: Physics, Condensed Matter

Research Areas: Physics

IDS Number: 842WW

ISSN: 1434-6028

References:

1.Title: [not available]
Author(s): Anderson, O L; Stuart, D A.
Source: <IT>J. Am. Ceram. Soc</IT> Volume: 37 Pages: 573 DOI: 10.1111/j.1151-2916.1954.tb13991.x Published: 1954

2. Title: ESR, IR and optical absorption studies of Cu2+ spin probe in xNa(2)O-(50-x)ZnO-50B(2)O(3) ternary glasses
Author(s): Babu, JC; Suresh, S; Mouli, VCSource: INDIAN JOURNAL OF PURE & APPLIED PHYSICS Volume: 43 Issue: 11 Pages: 833-837 Published: NOV 2005

3. Title: Structure and properties of silver phosphate glasses-infrared and visible spectra
Author(s): Bartholomew, R.F.
Source: Journal of Non-Crystalline Solids Volume: 7 Issue: 3 Pages: 221-35 DOI: 10.1016/0022-3093(72)90024-5 Abstract Number: A1972-040655 Published: April 1972

4. Title: Nuclear magnetic resonance investigations of the structure of lead borate glasses
Author(s): Bray, P.J.; Leventhal, M.; Hooper, H.O.Source: Physics and Chemistry of Glasses Volume: 4 Issue: 2 Pages: 47-66 Abstract Number: A1963-18148 Published: 04 1963

5. Title: CHARACTERIZATION OF VARIOUS GLASSES IN THE BINARY PBO-GEO2 AND BI2O3-GEO2 SYSTEMS
Author(s): CANALE, JE; CONDRATE, RA; NASSAU, K; et al.
Source: JOURNAL OF THE CANADIAN CERAMIC SOCIETY Volume: 55 Pages: 50-56 Published: 1986

6.Title: [not available]
Author(s): Chang-Yin, Cheny.
Source: Chem. Abstract Volume: 93 Pages: 52428 Published: 1980

7. Title: A RAMAN INVESTIGATION OF CADMIUM BORATE AND BOROGERMANATE GLASSES
Author(s): CHRYSSIKOS, GD; KAMITSOS, EI; RISEN, WM
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 93 Issue: 1 Pages: 155-168 DOI: 10.1016/S0022-3093(87)80035-2 Abstract Number: A1987-138447 Published: AUG 1987

8.Title: [not available]
Author(s): Culea, E.; Pop, L.; Bosca, M.; et al.
Source: J. Phys. Conf. Ser Volume: 182 Article Number: 012061 Published: 2009

9. Title: [not available]
Author(s): Di Martino, D.; Almeida, R.; Santos, L.; et al.
Source: ISIS 2003 Published: 2003
Publisher: Science Highlights, CCLRC

10. Title: Density-structure correlations in silicate glasses
Author(s): Doweidar, H
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 249 Issue: 2-3 Pages: 194-200 DOI: 10.1016/S0022-3093(99)00310-5 Abstract Number: A1999-20-6140D-011 Published: JUL 1999

11. Title: Density and molar volume of Li2O-SiO2 glasses in relation to their microstructure
Author(s): Doweidar, H
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 39 Issue: 5 Pages: 286-289 Abstract Number: A1998-22-6140D-073 Published: OCT 1998

12. Title: STRUCTURE TRANSPORT RELATIONSHIPS IN LEAD BORATE GLASSES CONTAINING V2O5
Author(s): DOWEIDAR, H; GOHAR, IA; MEGAHED, AA; et al.
Source: SOLID STATE IONICS Volume: 46 Issue: 3-4 Pages: 275-281 DOI: 10.1016/0167-2738(91)90226-2 Abstract Number: A1991-122311 Published: JUL 1991

13. Title: EFFECT OF GAMMA-RADIATION AND THERMAL-TREATMENT ON SOME PHYSICAL-PROPERTIES OF ZNO-PBO-B2O3 GLASSES
Author(s): DOWEIDAR, H; ZEID, MAA; ELDAMRAWY, GM
Source: JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 24 Issue: 12 Pages: 2222-2228 DOI: 10.1088/0022-3727/24/12/015 Abstract Number: A1992-07-6180E-001 Published: DEC 14 1991

14. Title: Electrical properties of lead borosilicate glasses
Author(s): El-Damrawi, G; Mansour, E
Source: PHYSICA B-CONDENSED MATTER Volume: 364 Issue: 1-4 Pages: 190-198 DOI: 10.1016/j.physb.2005.04.012 Published: JUL 15 2005

15. Title: Germanium coordination and the germanate anomaly
Author(s): Henderson, GS; Wang, HM
Source: EUROPEAN JOURNAL OF MINERALOGY Volume: 14 Issue: 4 Pages: 733-744 DOI: 10.1127/0935-1221/2002/0014-0733 Published: JUL-AUG 2002

16. Title: THE STRUCTURE OF GLASSES ALONG THE NA2O-GEO2 JOIN
Author(s): HENDERSON, GS; FLEET, ME
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 134 Issue: 3 Pages: 259-269 DOI: 10.1016/0022-3093(91)90384-I Abstract Number: A1992-01-6140D-002 Published: OCT 1991

17. Title: Structure of potassium germanophosphate glasses by X-ray and neutron diffraction. Part 1: Short-range order
Author(s): Hoppe, U.; Brow, R. K.; Wyckoff, N. P.; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 30 Pages: 3572-3579 DOI: 10.1016/j.jnoncrysol.2008.03.012 Published: JUL 15 2008

18. Title: STRUCTURAL STUDY OF RB AND (RB, AG) GERMANATE GLASSES BY EXAFS AND XPS
Author(s): HUANG, WC; JAIN, H; MARCUS, MA

Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 180 Issue: 1 Pages: 40-50 DOI: 10.1016/0022-3093(94)90395-6 Abstract Number: A1995-04-6140D-017 Published: DEC 1994

19. Title: STRUCTURE OF SIMPLE GERMANATE GLASS
Author(s): IVANOV, AO; EVSTROPEV, KS
Source: DOKLADY AKADEMII NAUK SSSR Volume: 145 Issue: 4 Pages: 797-& Published: 1962

20. Title: Structure-property correlation in glasses by infrared reflectance spectroscopy
Author(s): Kamitsos, EI; Yiannopoulos, YD; Varsamis, CP; et al.
Conference: 14th University Conference on Glass Science Location: LEHIGH UNIV, BETHLEHEM, PENNSYLVANIA Date: JUN 17-20, 1997
Sponsor(s): Corning Inc; Amer Ceram Soc, Lehigh Valley Chapter; Lehigh Univ, Dept Mat Sci & Engn; Lehigh Univ, Mat Res Ctr; Natl Sci Fdn; Amer Ceram Soc
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 222 Pages: 59-68 DOI: 10.1016/S0022-3093(97)90097-1 Abstract Number: A1998-06-6140D-007 Published: DEC 1997

21. Title: INFRARED REFLECTANCE SPECTRA OF LITHIUM BORATE GLASSES
Author(s): KAMITSOS, EI; PATSIS, AP; KARAKASSIDES, MA; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 126 Issue: 1-2 Pages: 52-67 DOI: 10.1016/0022-3093(90)91023-K Abstract Number: A1991-030079 Published: DEC 1990

22. Title: VIBRATIONAL-SPECTRA OF MAGNESIUM-SODIUM-BORATE GLASSES .2. RAMAN AND MIDINFRARED INVESTIGATION OF THE NETWORK STRUCTURE
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: JOURNAL OF PHYSICAL CHEMISTRY Volume: 91 Issue: 5 Pages: 1073-1079 DOI: 10.1021/j100289a014 Abstract Number: A1987-077540 Published: FEB 26 1987

23. Title: A VIBRATIONAL STUDY OF LITHIUM BORATE GLASSES WITH HIGH LI2O CONTENT
Author(s): KAMITSOS, EI; KARAKASSIDES, MA; CHRYSSIKOS, GD
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 28 Issue: 5 Pages: 203-209 Abstract Number: A1988-044826 Published: OCT 1987

24. Title: STRUCTURE-ANALYSIS OF NA2O.4GEO2 GLASS BASED ON X-RAY-DIFFRACTION
Author(s): KAMIYA, K; YOKO, T; MIKI, Y; et al.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 91 Issue: 2 Pages: 279-292 DOI: 10.1016/S0022-3093(87)80312-5 Abstract Number: A1987-097956 Published: MAY 1987

25. Title: Fabrication and characterization of Er3+-doped GeO2-PbO and GeO2-PbO-Bi2O3 glass fibers
Author(s): Kassab, L. R. P.; Hora, W. G.; Martinelli, J. R.; et al.
Conference: 7th Brazilian Symposium on Glasses and Related Materials/3rd International

Symposium on Non-Crystalline Solids in Brazil Location: Maringa, BRAZIL Date: NOV 13-16, 2005
Sponsor(s): Natl Council Sci & Technol Dev; CNPq; Brazilian Innvovat Agcy; FINEP; CAPES Fdn; Parana Fdn; Fund Araucar
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 352 Issue: 32-35 Pages: 3530-3534 DOI: 10.1016/j.jnoncrysol.2006.03.086 Published: SEP 15 2006

26. Title: Glass formation in and structural investigation of Li2S+GeS2+GeO2 composition using Raman and IR spectroscopy
Author(s): Kim, Y; Saienga, J; Martin, SW
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 351 Issue: 49-51 Pages: 3716-3724 DOI: 10.1016/j.jnoncrysol.2005.09.028 Published: DEC 1 2005

27. Title: NUCLEAR MAGNETIC RESONANCE INVESTIGATIONS OF COMPOUNDS AND GLASSES IN SYSTEMS PBO-B2O3 AND PBO-SIO2
Author(s): LEVENTHA.M; BRAY, PJ
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 6 Issue: 4 Pages: 113-& Abstract Number: A1965-30366 Published: 1965

28. Title: GeO2-PbO glassy system for infrared fibers for delivery of Er:YAG laser energy
Author(s): Lezal, D; Pedlikova, J; Horak, J
Conference: 8th International Conference on the Physics of Non-Crystalline Solids Location: ABO AKAD UNIV, TURKU, FINLAND Date: JUN 28-JUL 01, 1995
Sponsor(s): Finnish Minist Educ; Acad Finland; Abo Akad Fdn
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 196 Pages: 178-182 DOI: 10.1016/0022-3093(95)00582-X Abstract Number: A1996-15-8120P-001; B1996-08-0570-001 Published: MAR 1996

29.Title: [not available]
Author(s): Lide, DR.
Source: HDB CHEM PHYS Published: 2003
Publisher: CRC Press, Boca Raton, FL, USA

30. Title: Electrical properties and FTIR spectra of ZnO-PbO-P2O5 glasses
Author(s): Mansour, E.; El-Damrawi, G.
Source: PHYSICA B-CONDENSED MATTER Volume: 405 Issue: 8 Pages: 2137-2143 DOI: 10.1016/j.physb.2010.01.121 Published: APR 15 2010

31. Title: [not available]
Author(s): Margaryan, A.; Piliavin, M.A.
Source: Germanate Glasses, Structure, Spectroscopy, and Properties Published: 1993
Publisher: Artech House, Boston

32. Title: Structure and dynamics of phosphate glasses
Author(s): Matic, A; Borjesson, L
Conference: 6th International Workshop on Disordered Systems Location: ANDALO, ITALY Date: MAR 03-06, 1997
Sponsor(s): Univ Trento, Dipartiemento Fis; Grp Nazl Struttura Mat; Consiglio Nazl Ric; Cassa

Risparmio Trento & Rovereto
Source: PHILOSOPHICAL MAGAZINE B-PHYSICS OF CONDENSED MATTER STATISTICAL MECHANICS ELECTRONIC OPTICAL AND MAGNETIC PROPERTIES Volume: 77 Issue: 2 Pages: 357-362 DOI: 10.1080/13642819808204962 Abstract Number: A1998-07-6140D-015 Published: FEB 1998

33. Title: Glass formation in the MoO3-CuO-PbO system
Author(s): Milanova, Margarita; Iordanova, Reni; Kostov, Krassimir L.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 355 Issue: 6 Pages: 379-385 DOI: 10.1016/j.jnoncrysol.2008.12.004 Published: MAR 1 2009

34. Title: UTILIZATION OF INFRARED-SPECTROSCOPY TO DETERMINE THE FRACTION OF THE 4 COORDINATED BORONS IN BORATE GLASSES
Author(s): MOUSTAFA, YM; DOWEIDAR, H; ELDAMRAWI, G
Source: PHYSICS AND CHEMISTRY OF GLASSES Volume: 35 Issue: 2 Pages: 104-106 Abstract Number: A1994-11-6140D-009 Published: APR 1994

35. Title: SOME PHYSICAL PROPERTIES OF ALKALI GERMANATE GLASSES
Author(s): MURTHY, MK; IP, J
Source: NATURE Volume: 201 Issue: 491 Pages: 285-& DOI: 10.1038/201285a0 Published: 1964

36. Title: VIBRATIONAL SPECTROSCOPY OF CATION-SITE INTERACTIONS IN PHOSPHATE-GLASSES
Author(s): NELSON, BN; EXARHOS, GJ
Source: JOURNAL OF CHEMICAL PHYSICS Volume: 71 Issue: 7 Pages: 2739-2747 DOI: 10.1063/1.438679 Abstract Number: A1980-002744 Published: 1979

37. Title: Elastic flexibility, fast-ion conduction, boson and floppy modes in AgPO3-AgI glasses
Author(s): Novita, Deassy I.; Boolchand, P.; Malki, M.; et al.
Source: JOURNAL OF PHYSICS-CONDENSED MATTER Volume: 21 Issue: 20 Article Number: 205106 DOI: 10.1088/0953-8984/21/20/205106 Published: MAY 20 2009

38. Title: FTIR spectroscopic study of some bismuth germanate glasses containing gadolinium ions
Author(s): Pascuta, Petru; Culea, Eugen
Source: MATERIALS LETTERS Volume: 62 Issue: 25 Pages: 4127-4129 DOI: 10.1016/j.matlet.2008.06.015 Published: SEP 30 2008

39. Title: The local structure of bismuth germanate glasses and glass ceramics doped with europium ions evidenced by FT-IR spectroscopy
Author(s): Pascuta, Petru; Pop, Lidia; Rada, Simona; et al.
Conference: 4rd International Conference on Advanced Vibrational Spectroscopy (ICAVS-4) Location: Corfu, GREECE Date: JUN 10-15, 2007
Source: VIBRATIONAL SPECTROSCOPY Volume: 48 Issue: 2 Special Issue: SI Pages: 281-284 DOI: 10.1016/j.vibspec.2008.01.011 Published: NOV 20 2008

40. Title: Experimental and theoretical investigations of the copper-lead-germanate glasses
Author(s): Rada, S.; Chelcea, R.; Culea, M.; et al.

Source: JOURNAL OF MOLECULAR STRUCTURE Volume: 977 Issue: 1-3 Pages: 170-174 DOI: 10.1016/j.molstruc.2010.05.028 Published: AUG 10 2010

41. Title: Towards understanding of the germanate anomaly in europium-lead-germanate glasses
Author(s): Rada, S.; Culea, E.; Rada, M.
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 356 Issue: 25-27 Pages: 1277-1281 DOI: 10.1016/j.jnoncrysol.2010.04.020 Published: JUN 1 2010

42. Title: Spectroscopic and magnetic studies of manganese ions in ZnO-Sb2O3-B2O3 glass system
Author(s): Reddy, MS; Krishna, GM; Veeraiah, N
Source: JOURNAL OF PHYSICS AND CHEMISTRY OF SOLIDS Volume: 67 Issue: 4 Pages: 789-795 DOI: 10.1016/j.jpcs.2005.11.010 Published: APR 2006

43. Title: STRUCTURE OF MOLTEN OXIDES .1. VISCOSITY OF GEO2, AND BINARY GERMANATES CONTAINING LI2O, NA2O, K2O, AND RB2O
Author(s): RIEBLING, EF
Source: JOURNAL OF CHEMICAL PHYSICS Volume: 39 Issue: 7 Pages: 1889-& DOI: 10.1063/1.1734549 Abstract Number: A1964-00162 Published: 1963

44. Title: Abrupt boundaries of intermediate phases and space filling in oxide glasses.
Author(s): Rompicharla, K; Novita, D I; Chen, P; et al.
Source: Journal of physics. Condensed matter : an Institute of Physics journal Volume: 20 Issue: 20 Pages: 202101 DOI: 10.1088/0953-8984/20/20/202101 Published: 2008-May-21 (Epub 2008 Apr 15)

45. Title: MIXED ALKALI GLASS SPECTRA AND STRUCTURE
Author(s): ROUSE, GB; MILLER, PJ; RISEN, WM
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 28 Issue: 2 Pages: 193-207 DOI: 10.1016/0022-3093(78)90006-6 Abstract Number: A1978-060435 Published: 1978

46. Title: Vibrational spectroscopy study of niobium germanosilicate glasses
Author(s): Santos, L. F.; Wondraczek, L.; Deubener, J.; et al.
Conference: 10th International Conference on the Structure of Non-Crystalline Materials (NCM 10) Location: Prague, CZECH REPUBLIC Date: SEP 18-22, 2006
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 353 Issue: 18-21 Pages: 1875-1881 DOI: 10.1016/j.jnoncrysol.2007.02.018 Published: JUN 15 2007

47. Title: PROPERTIES AND STRUCTURE OF B2O3-GEO2 GLASSES
Author(s): SHELBY, JE
Source: JOURNAL OF APPLIED PHYSICS Volume: 45 Issue: 12 Pages: 5272-5277 DOI: 10.1063/1.1663229 Abstract Number: A1975-025309 Published: 1974

48. Title: Dielectric dispersion and certain other physical properties of ZnO-Ga2O3-P2O5 glass system
Author(s): Subbalakshmi, P.; Durga, D. K.; Kumari, B. Anila; et al.
Book Editor(s): Veeraiah, N; Kothiyal, GP; Kityk, IV; et al.
Conference: International Seminar on Science and Technology of Glass Materials (ISSTGM-

2009) Location: Acharya Nagarjuna Univ, Guntur, INDIA Date: MAR 16-19, 2009 Source: INTERNATIONAL SEMINAR ON SCIENCE AND TECHNOLOGY OF GLASS MATERIALS (ISSTGM 2009) Book Series: IOP Conference Series-Materials Science and Engineering Article Number: 012023 DOI: 10.1088/1757-899X/2/1/012023 Published: 2009

49. Title: The structure and optical properties of GeO2-GeS2 glasses
Author(s): Terakado, Nobuaki; Tanaka, Keiji
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 354 Issue: 18 Pages: 1992-1999 DOI: 10.1016/j.jnoncrysol.2007.11.003 Published: APR 15 2008

50. Title: VIBRATIONAL SPECTROSCOPY ON THE PBO-PBSO4 SYSTEM AND SOME RELATED-COMPOUNDS .1. FUNDAMENTALS, INFRARED AND RAMAN-SPECTROSCOPY

Author(s): TRETTENHAHN, GLJ; NAUER, GE; NECKEL, A
Conference: 5TH AUSTRIAN / HUNGARIAN INTERNATIONAL CONF ON VIBRATIONAL SPECTROSCOPY Location: LINZ, AUSTRIA Date: JUL 06-08, 1992
Sponsor(s): AUSTRIAN ACAD SCI; HUNGARIAN ACAD SCI; AUSTRIAN SOC ANAL CHEM
Source: VIBRATIONAL SPECTROSCOPY Volume: 5 Issue: 1 Pages: 85-100 DOI: 10.1016/0924-2031(93)87058-2 Published: APR 28 1993

51. Title: Pulsed laser deposited lead-germanate glass systems
Author(s): Tsigara, A; Velli, L; Giannoudakos, A; et al.
Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 79 Issue: 4-6 Pages: 1319-1321 DOI: 10.1007/s00339-004-2762-3 Abstract Number: A2005-01-7865M-001 Published: SEP 2004

52. Title: NEUTRON-SCATTERING FROM PBO-GEO2 GLASSES
Author(s): UMESAKI, N; BRUNIER, TM; WRIGHT, AC; et al.
Conference: Yamada Conference XXXXI/International Conference on Neutron Scattering (ICNS 94) Location: SENDAI, JAPAN Date: OCT 11-14, 1994
Sponsor(s): Yamada Sci Fdn
Source: PHYSICA B Volume: 213 Pages: 490-492 DOI: 10.1016/0921-4526(95)00189-G Abstract Number: A1995-22-6140D-011 Published: AUG 1995

53. Title: Mixed alkali effect on calcium aluminogermanate glasses
Author(s): Wang, JS; Hon, KM; Yang, KH; et al.
Source: CERAMICS INTERNATIONAL Volume: 23 Issue: 2 Pages: 153-157 DOI: 10.1016/S0272-8842(96)00015-6 Published: 1997

54. Title: Medium range order in glass and the 'germanate anomaly' effect
Author(s): Yiannopoulos, YD; Varsamis, CPE; Kamitsos, EI
Source: CHEMICAL PHYSICS LETTERS Volume: 359 Issue: 3-4 Pages: 246-252 Article Number: PII S0009-2614(02)00668-1 DOI: 10.1016/S0009-2614(02)00668-1 Abstract Number: A2002-19-6140D-001 Published: JUN 20 2002

55. Title: Density of alkali germanate glasses related to structure
Author(s): Yiannopoulos, YD; Varsamis, CPE; Kamitsos, EI
Conference: 8th International Conference on the Structure on Non-Crystalline Materials (NCM 8) Location: UNIV WALES, ABERYSTWYTH, WALES Date: AUG 06-11, 2000
Sponsor(s): Corning Glass; British Nucl Fuels plc; Pilkington plc; Soc Glass Technol
Source: JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 293 Pages: 244-249 DOI: 10.1016/S0022-3093(01)00677-9 Abstract Number: A2002-03-6140D-015 Published: NOV 2001