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The influence of rare earth elements, such as Ce and Sm possesing high luminescence, on the radiation defect produ. have been studied in fused silica irradiated by high doses (10^{8}–10^{9} Gr) of γ-ray and fluence (10^{17}–10^{19} n-sm^{-2}) of neutrons. It has been shown that such impurities efficiently transforms the energy of electronic excitation into that of emission, and thereby reduces the probability of the subthreshold defect formation in the fused silica.

123: 347627p **Microstructure study of Bi_2S_3 microcrystallite-doped gel glass.** Ye, Hui; Jiang, Zhonghong (Shanghai Inst. of Optics and Fine Mechanics, Academia Sinica, Peop. Rep. China 201800). *Boli Yu Tangci* **1995**, 23(4), 1-4, 43 (Ch). The microstructure of 0.5% Bi_2S_3 microcrystallite doped SiO_2 gel-glass was studied by electron diffraction and HRTEM. The Bi_2S_3 microcrystallites could be clearly found in the HRTEM photograph, and their size and distribution were also revealed. The nonlinear refractive index n_2 of the Bi_2S_3 doped glass was first detd. as $n_2 = 8.3089 \times 10^{-8}$ esu by using the Z-Scan exptl. technique.

123: 347628q **Automation of calculating physical properties of inorganic glasses and its implementation.** Wang, Zebin (China Weapon Ind Co., Peop. Rep. China 441406). *Boli Yu Tangci* **1995**, 23(6), 44–50, 58 (Ch). Considering Gan Fuxi's system for calcg. phys. properties of inorg. glasses and relative research results, the author applied Turbo C2.0 language and structural programming technique to realization of automatization of calcg. phys. properties or inorg. glasses. This design principle is also suitable for other system design.

123: 347629r **Study on the structure of gel-glass and glass-ceramic of PZTS system.** Yao, Kui; Zhou, Qifa; Zhang, Liangying; Yao, Xi (Electronic Materials Research Lab., Xi'an Jiaotong Univ., Xi'an, Peop. Rep. China 710049). *Guisuanyan Tongbao* **1995**, 14(3), 9–13, 24 (Ch). Homogeneous and transparent gel-glass of Pb–Zr–Ti–Si (PZTS) system was synthesized at moderate temp. by sol-gel method, and $PbTiO_3$, $Pb(Ti,Zr)O_3$ nanocrystals were grown from the gel-glass. The anal. of IR spectra showed that Si–O–Si, Si–O–Ti, and Si–O–Zr bonds were formed in the gelling process, Si–O–Si bonds were enhanced and the Si–O–Ti and Si–O–Zr bonds disappeared at higher temps. The crystn. of ZrO_2 and SiO_2 prevented the formation of composite Pb, Zr, Ti perovskite crystal structure in PZTS system. The crystn. index and the apparent activation energy were calcd. by the Kissinger method.

123: 347630j **Wetting of mica with glasses of aluminum-boron-silicate system in mica-ceramic matrixes.** Chilikanova, L. V.; Baiborodin, V. A.; Fedorova, S. V. (Politekh. Inst., Irkutsk, Russia). *Ajgez. Rasplavov Paika Mater.* **1994**, 31, 99–101 (Russ). Phlogopites from various deposits were studied as wetted by the glass N 203 with homogeneous crystallog. structure and slight variations in chem. compn. Concn. curves obtained for the region of mica particles contact with the glass have been analyzed by the MAP method. Temp. dependence of specific cubic elec. resistance of the phlogopite mica ceramics in the range from the room temp. to 600°C has been studied.

123: 347631k **Photoluminescence and optically detected magnetic resonance in Ge_xSi_{1-x} system glasses.** Cernoskova, E.; Cernosek, Z.; Henry, A.; Swiatek, K.; Frumar, M. (Joint Laboratory of Solid State Chemistry of the Czech Academy of Sciences and University of Pardubice, 530 09 Pardubice, Czech.). *Mater. Lett.* **1995**, 25(1,2), 21–5 (Eng). The photoluminescence (PL) and optically detected magnetic resonance (ODMR) of Ge_xSi_{1-x} glasses from the whole glass-forming region ($0.15 \le x \le 0.44$; T = 2–8 K) were studied. Four broad bands (≈0.3 eV) of PL with const. energies (0.70, 0.86, 0.94, 1.08 eV) for all studied glasses were found when the excitation energy was lower than E_g^{opt}. The intensities of individual bands depend on compn., the integral PL intensity has a local min. for x = 0.25 and a local max. for x = 0.44. The most intensive is the band with E_{PL} = 1.08 eV. The ODMR spectra with $g_1 = 5.0$, $g_2 = 2.7$ and $g = 2.006$ were found only in glasses with x>0.4. The g_1 and g_2 values of ODMR bands are characteristic for S = 1 triplet of exciton, the g = 2.006 corresponds to the value of an asym. ESR band of glasses with x>0.4. The explanation of a large Stokes shift is discussed. The radiative recombination proceeds probably between intrinsic defect states in the gap and tail states of the valence band.

123: 347632m **Optical properties of dysprosium-doped low-phonon-energy glasses for a potential 1.3 μm optical amplifier.** Tanabe, Setsuhisa; Hanada, Teiichi; Watanabe, Masayuki; Hayashi, Tetsusuke; Soga, Naohiro (Dep. Materials Chemistry, Kyoto Univ., Kyoto, Japan 606-01). *J. Am. Ceram. Soc.* **1995**, 78(11), 2917–22 (Eng). Dysprosium-doped glasses were prepd. in the gallium-based sulfide, tellurite, zirconium-based fluoride and indium-based fluoride systems and their optical properties were studied. From the absorption cross sections of five f-f bands, three Judd-Ofelt parameters, Ω_t (t = 2, 4, 6), of Dy^{3+} ion were detd. The compositional variation of the Ω_2 value showed the order sulfide > tellurite > fluorozirconate > fluoroindate, whereas the Ω_6 value showed the opposite tendency. Compositional variation of the fluorescence intensity ratio of the $({}^4F_{9/2} \rightarrow {}^6H_{13/2})/({}^4F_{9/2} \rightarrow {}^6H_{15/2})$ is explained by the ratio of Ω_2/Ω_6 of doped Dy^{3+}. The emission probabilities A and the branching ratio β from $^6H_{9/2}$ and $^6F_{11/2}$ levels, which are the doublet initial level of the 1.3 μm luminescence, were calcd. for the glasses, and it was found that both values showed a tendency similar to that of Ω_2 against the glass compn. In the sulfide glass, A was 2.6 × 10^3 s^{-1} and β was 93%, both the highest in all of the glasses investigated. By 1.06 μm pumping of a Nd:YAG laser, the sulfide glass showed strong 1.3 μm emission and the lifetime was 25 μs, resulting in a quantum efficiency of 7%. This value is higher than that of the Pr^{3+}:$^1G_4$ level in ZBLAN glass with β = 60%.

123: 347633n **Investigation of TLD properties of metal alloy oxides, glass, ceramics and various papers.** Ertuğ, A. Y.; Yasar, S.; Karakelle, B.; Yasar, D. (TAEA, Cekmece Nuclear Research and Training Center, Istanbul, Turk. 34831). *Radiat. Phys. Chem.* **1995**, 46(4-6, Proceedings of the 9th International Meeting on Radiation Processing, 1994, Pt. 2), 1199–202 (Eng). A large no. of materials exhibit radiothermoluminescence and they are extensively used for radiation process control. In this work, the thermoluminescence dosimetry (TLD) properties of metal alloy oxides, glass, ceramics and various papers are investigated to evaluate their possible usage as TL detectors or indicators in dose measurement. TL glow curves and the effect of absorbed dose on TL response are measured for materials locally available. The fading effect are also examd. The use of these materials as a dose indicator is shown to be promising.

123: 347634p **Influence of variable valency elements upon radiation induced centers in oxide glasses.** Mamedov, E. K. (Sector of Radiation Researches, Azerbaijan Academy of Sciences, Azerbaijan). *Radiat. Phys. Chem.* **1995**, 46(4-6, Proceedings of the 9th International Meeting on Radiation Processing, 1994, Pt. 1), 561–4 (Eng). The effects of variable valency Ce, Sb, Bi, Ti or Sn elements, being at both one and two states of oxidn., on capture charge centers of an electron and hole nature induced by irradn. in various silicate glasses has been considered. The ESR spectra of original and activated glasses exposed to irradn. with oxidn. states of variable valency elements are compared.

123: 347635q **Preparation and investigation on glasses in the $Te_{45}As_{32}Ge_{10}Si_{13}$ and $Te_{41}As_{37}Ge_{10}Si_{12}$ systems.** Hegab, N. A.; Fadel, M.; El-Samanoudy, M. M. (Physics Dep., Ain Shams Univ., Cairo, Egypt). *J. Mater. Sci.* **1995**, 30(21), 5461–5 (Eng). Thin films of $Te_{45-x}As_{32+x}Ge_{10}Si_{13}$ (x = 0, 5) of different thicknesses are deposited on glass substrates by vacuum evapn. X-ray diffraction revealed the formation of amorphous films. The value of the optical band gap, E_g, is found to increase with increasing thickness of the films and with increasing As content. The films are heat treated at different temps. from 298 to 423 K. The values of E_g are found to decrease with increasing temp. of heat treatment. The band tail, E_e, obeys Urbach's empirical relation.

123: 347636r **Temperature-induced changes in the composition of float glass surfaces.** Laube, M.; Rauch, F. (Inst. Kernphysik, J. W. Goethe Univ., D-60486 Frankfurt/Main, Germany). *Fresenius' J. Anal. Chem.* **1995**, 353(3-4), 408–12 (Eng). Float glass is an important kind of com. glass, comprising the main body of modern flat glass used in buildings and vehicles. The stoichiometry of the surface layer differs from that of the bulk and will usually change due to subsequent high-temp. process steps or attack by water or humidity. Glass samples have been investigated by means of ion beam anal. Using resonant nuclear reaction anal. (^{15}N technique), hydrogen concn. profiles have been detd. Profiles of the heavier glass constituents, esp. sodium and tin, have been obtained by RBS. Changes in the compn. of the float glass surfaces caused by subsequent temp. treatment (up to 700°C) and by controlled hydration treatment are reported. Possible mechanisms of hydrogen uptake and release are discussed.

123: 347637s **Atomic force microscopy of coated glasses.** Raedlein, E.; Ambos, R.; Frischat, G. H. (Inst. Nichtmetallische Werkstoffe, Technische Univ. Clausthal, D-38678 Clausthal-Zellerfeld, Germany). *Fresenius' J. Anal. Chem.* **1995**, 353(3-4), 413–18 (Eng). At. force microscopy has been used to investigate the topol. of alkoxide gel dip coatings on different substrates. Results of SiO_2–TiO_2–ZrO_2 (STZ) coatings are presented on float glass, on polished fused silica, on com. coated insulating flat glass, and on Pt-Rh alloy. Consolidated STZ coatings display the so-called glass pattern with ripples equal or less than 2 nm high. The same pattern is seen on partially dense STZ coatings, as soon as the surface is stiff enough for scanning, and also on the bottom of a 50 nm deep sputtering crater in the consolidating coating. The vitreous STZ coating on the side of the float glass is as flat as the float glass itself. It has the same tendency to contamination. Polishing grooves 100 nm wide and 50 nm deep on fused silica have been filled up with the 80 nm thick coating, only dips of a few nm remain. The trenches between the SnO_2 crystallites on the insulating flat glass were filled up and the roughness of the substrate was partially reduced. Pt-Rh alloy sheet remained rough even after the coating. On the partially densified STZ coating, sputtering generates a grained surface.

123: 347638t **Optical microfabrication of chalcogenide glasses.** Hisakuni, H.; Tanaka, K. (Faculty Engineering, Hokkaido University, Sapporo, Japan 060). *Science (Washington, D. C.)* **1995**, 270(5238), 974–5 (Eng). It was found that chalcogenide glasses can be shaped by stressing the glass under light illumination because light illumination enhances the fluidity of the glass. The mechanism of photoinduced fluidity was found to be photoelectronic, i.e., athermal. The process can be applied to microfabrication of optical fibers and glassy films with a typical dimension of 10–100 μm.

123: 347639u **Second-harmonic generation from electrically poled niobium alkali silicate glasses.** Miyata, Masaaki; Nasu, Hiroyuki; Mito, Akihiro; Kurachi, Kiyoshi; Matsuoka, Jun; Kamiya, Kanichi (Dep. Chem. Mat., Mie Univ., Mie, Japan 514). *Jpn. J. Appl. Phys., Part 2* **1995**, 34(11A), L1455–L1457 (Eng). Second-harmonic generation (SHG) has been obsd. from elec. poled Nb_2O_5-contg. mixed alkali silicate glasses. The glasses were poled by application of various high d.c. voltages at various temps. for 2 h. SHG was observable from 150 °C and 1.0 kV, and the intensity increased with the increase of poling temp. and applied voltage. SHG intensity depended on Nb_2O_5 content, and the max. was seen for the glass contg. nearly 13 mol% Nb_2O_5.