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Bismuth and lead oxides codoped boron phosphate glasses for Faraday rotators

B. A. Sava^a, Lucica Boroica^{a*}, M. Elisa^b, O. Shikimaka^c, D. Grabco^c, M. Popa^c, Z. Barbos^c, R.

Iordanescu^b, A. M. Niculescu^a, V. Kuncser^d, A. C. Galca^d, M. Eftimie^e, R. C. C. Monteiro^f

^aNational Institute for Laser, Plasma and Radiation Physics, Laser Department, 409th Atomistilor Str., RO-77125, Magurele, Bucharest, Romania.

^bNational Institute of Research & Development for Optoelectronics - INOE 2000, 409th Atomistilor Str., RO-77125, Magurele, Bucharest, Romania.

^cInstitute of Applied Physics, Academy of Sciences of Moldova, 5 Academiei str., MD-2028, Chisinau, Republic of Moldova.

^dNational Institute of Materials Physics, Laboratory of Magnetism and Superconductivity, 405th Atomistilor str., RO-77125, Magurele, Romania.

^eUniversity "Politehnica" Bucharest, 313rd Splaiul Independenței str., RO-60042, Romania.

^fDepartment of Materials Sciences, (CENIMAT/I3N), Faculty of Sciences and Technology, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal.

*Corresponding author: 409th Atomistilor Str., RO-77125, Magurele, Bucharest, Romania, phone: +40729990594, boroica_lucica@yahoo.com.

Abstract

New magneto-optical vitreous materials were obtained by melting-quenching technique comprising wet route raw materials preparation. The glass has the following composition in oxide mol. %: 10 Li₂O, 9 Al₂O₃, 5 ZnO, (35; 20; 50) B₂O₃, (35; 50; 20) P₂O₅, 3 Bi₂O₃, 3 PbO, phosphorus and boron oxide being the vitreous network formers. It was also prepared a similar reference glass composition but without Bi₂O₃ and PbO. Optical and structural characterization by ultraviolet-visible (UV-Vis), Fourier Transform Infrared (FTIR) and Raman Spectroscopy of the bulk glasses showed a transmission over 90%, metaphosphate structure of glass together with Q² boron oxide units and P-O-B bonds. The mechanical parameters, hardness (*H*), Young's Modulus (*E*) and fracture toughness (*K_{IC}*) of boron phosphate glasses,

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