



Vanado-boron-phosphate glasses with electrical properties and process for obtaining them

Patent: A00484/ 05.09.2023

Authors: Ana Violeta Filip, Bogdan Alexandru Sava, Mihai Eftimie, Valentin Craciun

The invention relates to the production of vanado-boron-phosphate glasses, which have increased chemical homogeneity due to the method of manufacturing under conditions of improved mechanical, thermal, and chemical stability as well as electrical conduction properties beyond the range of insulators at room temperature and to the process for their production. The vanado-boro-phosphate glasses, according to the invention, contain only three vitreous network formers: 40 - 65 molar % V_2O_5 , 30 molar % P_2O_5 , and 5 - 30 molar % B_2O_3 , and the method of obtaining these glasses, the wet melt-quenching technique is characterized in that the raw material mixture is prepared wet, followed by the stages of pre-melting, melting, refining, conditioning, molding, shaping, annealing and processing of the obtained glass for analysis.

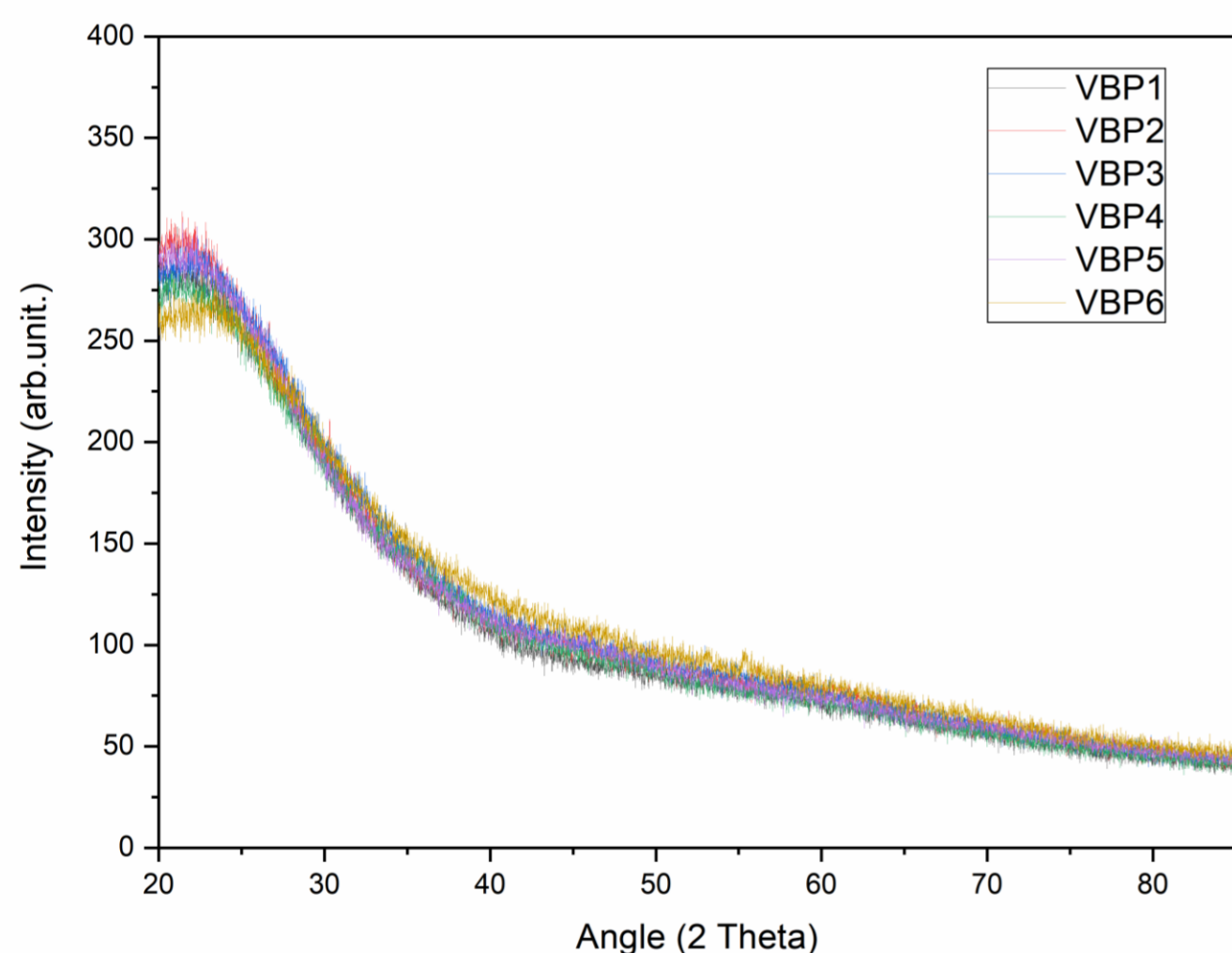


Figure 1. XRD diffractograms for vanado-boro-phosphate glasses.

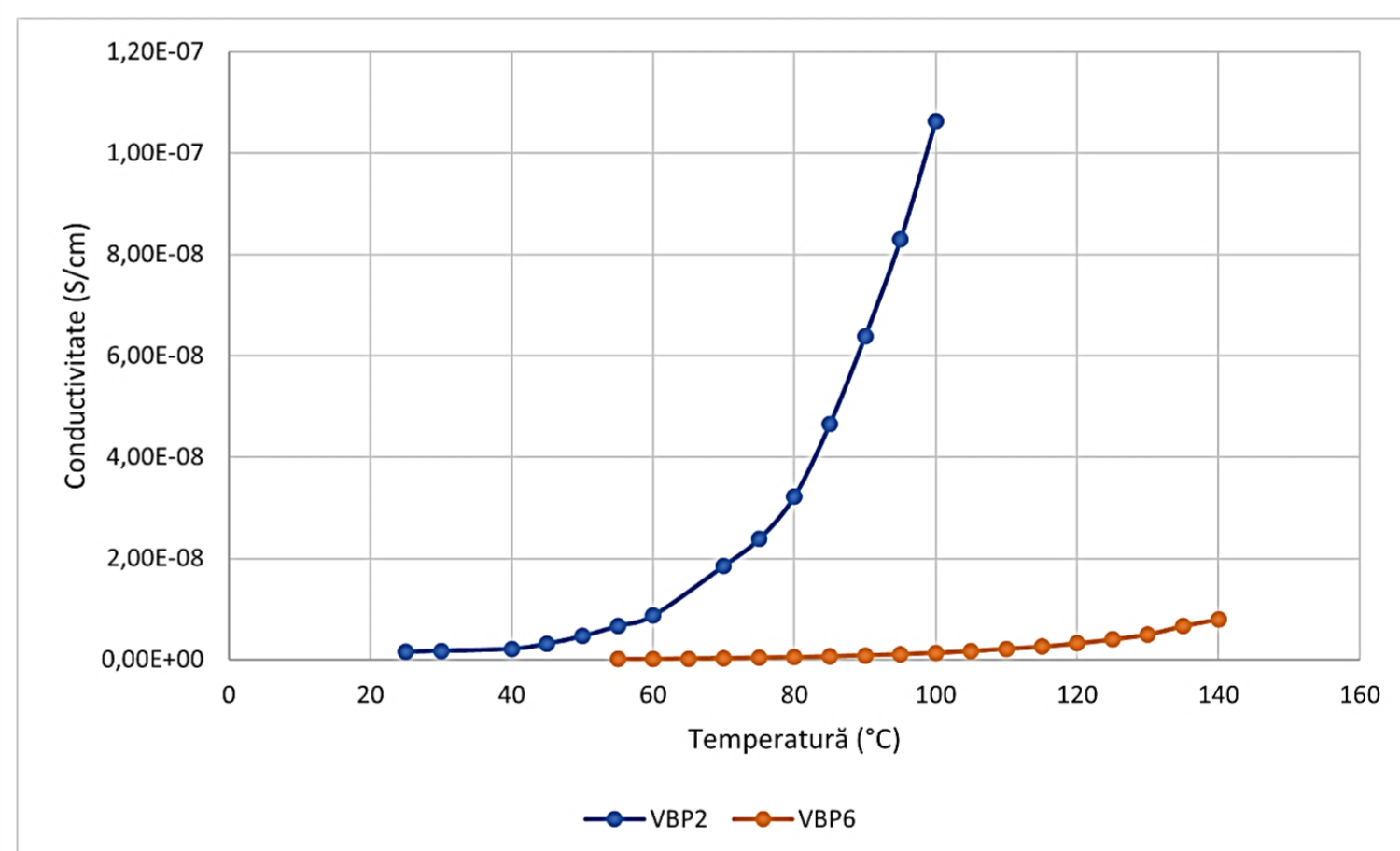


Figure 2. Electrical conductivity of VBP2 and VBP6 vanado-boro-phosphate glass as a function of temperature.

The invention can be industrially applied to the production of temperature sensor glasses, the product according to the invention being prepared with low energy consumption and low price from raw materials which are non-toxic and have improved mechanical, thermal, and chemical resistance compared to classical phosphate glasses, exhibiting a maximum transmission in the infrared range between 2 and 2.9 microns, as well as conductivity above 10^{-8} S/cm at room temperature.

Contact: **Ana Filip** ana_filip@ymail.com

Acknowledgements:

This work was supported by the UEFISCDI Romania, project PN-III-P1-1.1-PD-2021-0682 (PD42/2022), the Romanian Ministry of Research, Innovation and Digitization, under Program LAPLAS VII (30N/2023) and through Program I—Development of the National R & D System, Subprogram 1.2—Institutional Performance—Projects for Excellence Financing in RDI (13PFE/2021).