

## **The effect of bismuth on the structure and mechanical properties of GeO<sub>2</sub>–PbO–Bi<sub>2</sub>O<sub>3</sub> ternary bulk glass system**

### **ABSTRACT**

This paper reports the elastic properties and structure of GeO<sub>2</sub>6PbO6Bi<sub>2</sub>O<sub>3</sub> ternary bulk glasses which were successfully prepared by melt quenching technique. The study was performed by ultrasonic measurements and Fourier transform infra red (FTIR) spectroscopy. Increasing values of density, ultrasonic velocity and elastic moduli were observed due to substitution of bismuth to lead atoms with fixed composition of GeO<sub>2</sub>. Also, FTIR spectrum showed different profiles between samples with higher content of lead or bismuth. In Pb-rich samples all of the components contributed in the structure as network former; however, in Bi-rich samples lead and bismuth showed modifier behavior and the structure was depolymerized by adding of bismuth content.

**Keyword:** Germanate glass; Bi<sub>2</sub>O<sub>3</sub>; PbO; Elastic properties; FTIR spectroscopy