

## Physical properties of new Sb<sub>2</sub>O<sub>3</sub>-V<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O glasses

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### Abstract

New heavy metal oxide glasses have been prepared and the compositional limits have been investigated in the Sb<sub>2</sub>O<sub>3</sub>-V<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O ternary system. Chemical composition of glass samples was checked by EDS analysis. The influence of the V<sub>2</sub>O<sub>5</sub>/Sb<sub>2</sub>O<sub>3</sub> substitution on the physical properties of the (70-x) Sb<sub>2</sub>O<sub>3</sub>-V<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O glasses has been studied in the 0 < x < 40 range. Density decreases linearly from 4.3 g cm<sup>-3</sup> to 3.4 g cm<sup>-3</sup> as V<sub>2</sub>O<sub>5</sub> replaces Sb<sub>2</sub>O<sub>3</sub>. However, the evolution of the physical properties such as glass transition temperature, elastic modulus, thermal expansion and microhardness is not monotonous. T<sub>g</sub> increases for 0 < x < 5, but it decreases for x > 5 with a minimum value between 25% and 35% V<sub>2</sub>O<sub>5</sub>. This unusual behavior suggests changes in the coordination number of the vanadium cations in relation to the network topology..

**Keywords:** Vanadate glass, Glass transition, Density, Elastic moduli, Thermal expansion, Microhardness.

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