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# **Optical absorption and thermal expansion of semiconductor glasses As-S-Ge by topological transition**

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## **Abstract**

The effect of mean coordination number  $r$  on the optical absorption in the region of exponential tail and on the thermal expansion of chalcogenide glasses As-S-Ge are presented. Several important parameters such as optical gap, disorder energy, coefficient of the temperature expansion and their variation with composition have been found. These parameters are shown to be strongly influenced by average coordination number, especially in the region of topological transitions. It is significant that all these parameters exhibit maximums at  $r$  approximately equal to 2.7. The explanation is put forward in light of a model which predicts the transformation of the glassy network from two- to three- dimensional configuration at  $r$  approximately equal to 2.7. The correlation between optical gap (i.e. intrinsic absorption) and thermal expansion of the glasses shows the possibilities of absorption spectroscopy for testing the properties of non-crystalline materials including the thermo-mechanical ones.