Short range order in amorphous germanium tellurides

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Abstract

Short range order of several amorphous germanium telluride alloys (Ge-Te, Ge-Sb-Te, Ge-Cu-Te, Ge-Ga-Te, Ge-As-Cu-Te, Ge-Ag-I-Te...) has been investigated by diffraction techniques and EXAFS. Large scale structural models have been obtained by fitting experimental data (usually 3-5 datasets for each composition) simultaneously by the reverse Monte Carlo simulation technique.
It has been revealed that the 8-N rule is obeyed in Ge-Te, without any signs of threefold coordination for Te or distorted octahedral coordination of Ge. Introducing further components may alter the environment of Ge and Te as well as the connectivity of Ge-Te host network in different ways. Structural changes induced by various elements are overviewed. Limitations of experimentally available structural information are discussed and experiment-based models are compared with recent theoretical results.

Keywords: Ge, Te glasses, short range order, diffraction, EXAFS, modelling

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