CRYSTAL STRUCTURE OF OXYGEN / NITROGEN-DOPED GeSbTe PHASE-CHANGE MEDIA: INVESTIGATION USING GRAZING INCIDENCE X-RAY DIFFRACTION

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The effects of oxygen- and nitrogen-dopings on the crystal structure of GeSbTe recording layers of phase-change media were studied by X-ray diffraction. A high resolution grazing incidence X-ray diffraction optics using a laboratory X-ray source was developed to quantitatively analyze the crystal structure of thin film materials. Lattice parameter, crystallite size, and lattice strain were determined from diffraction profiles. The lattice parameter increased and the lattice strain decreased when the oxygen or nitrogen content increased. On the other hand, the crystallites grew larger with increasing oxygen content, and they became smaller with increasing nitrogen content.

The results of analysis and the experimental details will be presented.