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Title:Contrast in terahertz conductivity of phase-change materials

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Abstract:Time-domain terahertz spectroscopy was used to study the dielectric and conductive properties of thin films of four phase-change materials: GeTe, GeSb<inf>2</inf>Te<inf>4</inf>, GeSbTe<inf>2</inf>, and AgInSbTe. Both amorphous and crystalline phases were studied, and the spectra were analyzed by a model including a harmonic oscillator and the Drude term. Spectra in the crystalline phase of AgInSbTe are dominated by free-carrier motion with a scattering time of 50 fs. In the Ge-containing compounds, we observed a phonon mode and a conductive contribution of free charge carriers with a much shorter scattering time. The conductivity appears to be linked to the distortions of the crystal unit cell from cubic symmetry. © 2012 Elsevier Ltd. All rights reserved.

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Main heading:Conductive materials

Controlled terms:Crystal symmetry - Crystalline materials - Dielectric materials - Germanium - Phonons - Thin films

Uncontrolled terms:AgInSbTe - Conductive properties - Crystal unit cell - Crystalline phase - Crystalline phasis - Cubic symmetry - E. Light absorption and reflection - Electronic transport - Free charge carriers - Harmonic oscillators - Phonon mode - Scattering time - Tera Hertz - Time-domain terahertz spectroscopy

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