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Thermal conductivity of Chalcogenides Alloys: Energy and information storage applications

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Chalcogenide alloys exhibit excellent correlated properties essential for thermoelectric and energy storage in non-volatile based memory devices. This work presents an attempt to determine the thermal conductivity using two distinct light scattering methods on chalcogenide alloys in the various structural phases. Thin films of chalcogenide alloys formed from the Pseudo-binary tie line and eutectic phases have been grown using RF magnetron sputtering on (001) Si substrates. Using Cahill's random walk model on the phase velocities of the acoustic phonon modes, the minimum lattice thermal conductivity of the disordered phase is determined to be k < 0.5 W/mK. Our values are in close agreement with those measured by Time domain thermal reflectance (TDTR) for disordered phase for which the phonons are the dominant scatterers. A low thermal conductivity value is essential for thermal management in Phase change random access memory as well as for thermoelectric applications.

Apply to be considered for a student ; award (Yes / No)?

No

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No

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