

New materials for thermoelectric applications

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The use of new techniques on the synthesis of the materials and a deeper understanding on the parameters that affect the thermoelectric figure of merit has recently led to new systems with improved thermoelectric performances. In particular, the concept “phonon lattice and electron crystal” has been applied in order to obtain materials with lower thermal conductivities, while keeping their electrical transport characteristics. Three general strategies were successfully used in the last years to decrease the lattice thermal conductivity: i) the use of complex crystal structures, ii) the increase of “disorder” in the unit cell and iii) the use of nanostructured materials.

Here we present the work that has been recently performed in order to get new and improved thermoelectric systems. In particular, new strategies will be discussed in order to optimize the use of the “phonon lattice and electron crystal” concept. Special emphasis will be done on the possibility of conducting glasses representing a new family of enhanced thermoelectrical materials.

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