

Abstract of Presentation

Presentation Title:

Nanopowder thermoelectrics: improvement in heat conversion by nanostructuring

Abstract :

Thermoelectric energy conversion is gaining increasing importance as a means to use waste heat for the production of electricity. A future key issue for an improved efficiency of this type of energy harvesting is nanostructuring of the thermoelectric materials. This can occur by phase separation on the nanoscale leading to nanoscopic inclusions in a quasi-bulk matrix or by compacting of nanoscale powders produced in solution phase syntheses or by ball-milling. Such nanostructured thermoelectric materials show a reduction of their thermal conductivity due to enhanced phonon scattering and therefore an improvement of their conversion efficiency expressed in the figure of merit ZT with $ZT = (S^2\sigma)/\lambda$ (S : Seebeck coefficient; σ : electrical conductivity; λ : thermal conductivity).

The presentation will focus on the preparation and characterization of binary and ternary antimonide and telluride nanoscale powders. Different preparation methods and internal structuring modes of the obtained products will be discussed and compared. In addition to structural data, aspects of stability and metastability of different nanoscale thermoelectric materials will be presented.