



VIRTUAL SEMINAR

Thursday, 19.11.2020 at 13:00

Challenges in development of ZnO-based ceramics as thermoelectric material

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With variety of physical properties ZnO can give answers to many technological challenges of nowadays world related to energy, the environment and quality of life; fact that it is safe and biocompatible, stable in air to high temperatures and also inexpensive, are additional advantages, just as important for the successful utilizations of ZnO-based devices and technologies. These are all characteristics that are also demanded for thermoelectric materials, which offer only viable method for direct conversion of waste heat into electricity regardless source size, without moving parts and without production of environmentally harmful wastes.

ZnO is considered to be one of the most promising n-type thermoelectric oxides, having a very high Seebeck coefficient of about $-400 \mu\text{V/K}$. However, in contrary to general guidelines and requirements for a good thermoelectric material, ZnO has simple structure and chemical composition and hence much too high thermal conductivity, while its electrical conductivity is much too low. However, ZnO is very accommodating with respect to doping, which enables exceptional compositional, structural and microstructural tailoring of its physical properties. In the seminar different approaches from nano- to micro-level that we are studying to overcome the limitations of the ZnO as thermoelectric material will be presented; controlling the charge and heat transport is in the essence of this efforts as it represents a key issue for enhancement of the thermoelectric properties.

Kindly invited.