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Perovskite- and Heusler based materials for thermoelectric converters

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The broad application of thermoelectric converters in future energy technologies requires the development of active, stable, low cost and sustainable materials. Semiconductors based on perovskite and heusler structures show substantial potential for thermoelectric energy conversion processes [1-3]. Their good performance can be explained based on their suitable band structure, adjusted charge carrier density, mass and mobility, limited phonon transport, electron filtering possibilities, strongly correlated electronic systems, etc. These properties are widely tuneable by following theoretical concepts and a deep composition-structure-property understanding to change the composition, structure and size of the crystallites in innovative scalable synthesis procedures. Improved thermoelectric materials are developed, synthesised and tested in diverse high temperature applications to improve the efficiency and energy density of the thermoelectric conversion process. The lecture will provide a summary on the field of advanced perovskite-type ceramics and Heusler compounds gaining importance for a large number of future energy technologies.

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