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Title of the lecture: Thermoelectric properties of p-type TTT2I3 organic crystals as a function of temperature

Abstract

Nanostructured organic materials of tetrathiotetracene-iodide (TTT2I3) are very prospective p – type thermoelectric material. The internal structure is pronounced quasi-one dimensional, with molecular chains spaced at ~1 nm one from other. The charge transport takes place mainly along the chains, with rare phonon-assisted jumps between the chains. Earlier, the thermoelectric properties of this organic compound were estimated numerically in the frame of a detailed physical model, considering the most important internal interactions, as well as the weak interchain interactions. It was demonstrated [1] that important results could be obtained in TTT2I3 crystals after optimisation of some internal parameters of the crystal. However, the mentioned results were obtained for room temperature. For real applications, it is very important to investigate the temperature effects of the thermoelectric characteristics of TTT₂I₃ crystals. The obtained results are indicating that the thermoelectric power factor can be significantly enhanced for a wide range of crystal temperatures.

References

[1] Ionel Sanduleac, Anatolie Casian, State of the Art and new Possibilities to increase the Thermoelectric Figure of Merit of Organic Materials, Journal of Thermoelectricity, N.6, 2016.

Biography

Dr. Ionel Sanduleac (1989) is a theoretical physicist in the field of thermoelectric properties of organic nanostructured materials. He has worked in different scientific projects, international (FP7 nr. 308768) and national ones (11.817.05.13F and 14.02.116F). Currently, he is the coordinator of a national project for young researchers 19.80012.02.01F. During his research activity since 2012, he has disseminated the obtained results in more than 28 scientific publications and conference presentations.

Prof. Anatolie Casian (1935) is a theoretical physicist in the fields of semiconductors and of nanostructured materials. Area of interests: kinetic phenomena and thermoelectric properties of structures with quantum wells and of quasi-one-dimensional organic crystals. Academician of International Thermoelectric Academy (ITA). In 2017 he received the Golden Prize of ITA. Author of more than 300 publications. Coordinator of many national and international projects.