**Low-Dimensional Organic Conductors for Thermoelectric Applications**

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The intriguing properties of low-dimensional organic conductors distinguish them as interesting candidates for thermoelectric applications. In particular, their anisotropic metallic-like electrical conductivity reaching values of up to 105 S/m at room temperature in combination with a poor thermal transport characteristic for weak van-der-Waals bound crystals favor figures of merit, *zT =* (*σ S2/κ*)*T*, that are of technological relevance. By the correlated electron system and its strong coupling to the surrounding lattice remarkable phenomena emerge, like phonon drag effects or the violation of the Wiedemann-Franz law, which support the implementation of organic conductors in future thermoelectrics even further [1].



Fig.1 Temperature dependent power factor of n- and p-type conducting DCNQI2Cu and TTT2I3 radical ion salt crystals, respectively, (upper graph) and the related figures of merit (lower graph). From [2].

After introductory remarks on low-dimensional organic conductors and their correlated structural and electronic properties, we will demonstrate by means of two representatives of this class, the n-conducting DCNQI2Cu radical ion salt and the one-dimensional p-conductor TTT2I3, the complex thermoelectric behavior as function of temperature (see Fig. 1) [2]. Based on this information and the interdependence of the relevant quantities an all-organic thermoelectric generator comprised of the two organic conductors will be presented as a *proof-of-concept* and compared in its performance with alternative approaches. Strategies to further improve the thermoelectric performance of these low-dimensional organic conductors and their technological potential will be highlighted.

References

1. F. Huewe et al., Phys. Rev. B **92**, 155107 (2015)

2. F. Huewe, et al., Adv. Mater. **29**, 1605682 (2017)