Poster Presentation

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Evaluation of structural phase transition by pyroelectric measurements

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In non-centrosymmetric crystalline matter, marked by the pyroelectric effect, a change in temperature alters the materials spontaneous polarization, which further changes the charge density on the material's surface. This results in a current flow trough an external circuit, which differs drastically at the boundary between two crystallographic phases. Therefore, pyroelectric materials offer a great potential of low-temperature waste heat recovery by utilizing e.g. the Olsen-Cylce to convert residual heat into electric energy. A previous characterization is necessary to determine the operating conditions of the active material. This work presents a method to evaluate temperature depended pyroelectric properties, especially the pyroelectric coefficient p and the phase transition temperture TC, with the help of a computer controlled thermal/electrical stimulation and a simultaneously recording of the electrical response of the material. Here, the analysis with the Sharp-Garn-method [1] separates the pyroelectric from eventually disturbing non-pyroelectric signal, enabling the characterization of p and TC over a broad spectrum of materials, ranging from inorganic single crystals and ceramics to organic polymers.

[1] *I. Lubomirsky and O. Stafsudd, "Invited Review Article: Practical guide for pyroelectric measurements.," Rev Sci Instrum, vol. 83, no. 5, p. 051101, May 2012.*

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