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Prospect Nanostructured Material for Thermoelectric Sensors of Infrared Radiations

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In the last years it is observed an increasing application of thermoelectric biosensors in medicine. Thermoelectric sensors of infrared (IR) radiations are widely used for detection of radiations in special cases, in the thermometers for contactless measurement of temperature including that of the human body ones, in the investigation of surface temperatures of the human body, in new thermal imaging systems, in the systems of night vision. The thermoelectric sensor is based on the thermocouple or the thermopile containing materials of *p*- and *n*-type. Earlier the organic crystals of tetrathiotetracene-iodide, TTT_2I_3 , were proposed as effective material of *p*-type. In this paper the organic nanostructured crystals of $\text{TTT}(\text{TCNQ})_2$ are proposed as material of *n*-type. The main parameter that determines the possibility of a given material to be used as sensitive element in the thermoelectric sensors is the thermoelectric power factor. The electrical conductivity, thermopower and thermoelectric power factor are modeled in function of the Fermi energy and their optimal values are calculated in order to achieve the maximum of the power factor.