

Characterization of relaxor ferroelectrics as materials for uncooled infrared sensors

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Abstract

The infrared (IR) spectrum range is very attractive for developing gas, liquid and flame detectors and analyzers of different types, intruder alarms, and devices for thermal imaging. Relaxor ferroelectrics under DC bias (dielectric bolometer regime) are a promising materials for uncooled IR sensors. It is important to study materials properties at the experimental conditions close to operating conditions of IR detectors prototyping. Light Modulation Method is the best suited to this purpose and was used in this work. We present the result of complex pyroelectric and dielectric study of relaxors on the base of PbMg₁/3Nb₂/3O₃ in a wide temperature range under DC bias. Pyroelectric figures of merit and their dependences both on temperature and applied electric field were determined. Values of the current- and voltage responsivities as well as the specific detectivity for infrared sensors based on relaxors were estimated and compared with conventional pyroelectric and other uncooled infrared sensors. The work was supported by Russian Foundation of Basic Research, grant N 02-02-16389.