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Tenkých vrstev a nanostruktur

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TÉMA

Ab-initio investigation of the degradation process in TlBr: causes and possible fixes

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Functioning in a similar way to photovoltaics, semiconductors have been shown to work effectively as radiation detectors, capable of accuracy that allows even the identification of the isotope source of the radiation. The materials most suitable for that purpose, however, require high costs of fabrication or operation, severely limiting their large scale application for ends that go from medical to national security. In this work, we discuss the case of TlBr, which has been shown to achieve precision of up to 1-2% FWHM for radiation measurements, but that inevitably degrades after operation times that vary from few hours to several months. We shall discuss the mechanisms for this degradation process, using both parameter free quantum simulations as well as experimental data. We will show that accumulation of intrinsic ions at the electrodes is not likely to be the prevailing cause for this phenomenon. We will then discuss the importance of carefully selecting the material for the metal contacts in such devices.

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