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Organic-inorganic halide perovskites for the creation of promising photoelectronics products

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Recent studies of structured promising photovoltaic devices based on materials known as organic-inorganic perovskites (PVSKs) from the first simple compositions to complex, mixed with colloidal quantum dots (QDTs) structures (Quantum-dot-in-perovskite, QDiP) have been presented. There phase states, composition, photo-physics process, synthesis features and topological structures designed for various optoelectronic applications have been investigated. In order to expand the spectral range beyond the boundaries of the visible (Vis) range, various perovskite material compositions have been introduced into the new infrared (IR, IR) techniques, including a structure with an intermediate band (IB) in the energy diagram located between the valence band (VB) and the conduction band (CB). This intermediate zone allows absorbing radiation in a longer wavelength region, achieving a radiation conversion efficiency of ~ 50 % compared to devices based on a planar p–n junction with a maximum efficiency of ~ 25 %.

Keywords: perovskites, PVSKs, colloidal quantum dots, CQDs, QDiP-structures.

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