

Advanced interface engineering of perovskites: Displays, X-Ray detectors, single and tandem junction solar cells with competitive performance

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Perovskites have revolutionized the printed semiconductor research community. Perovskite X-Ray detectors are currently at eyesight with the most advanced semiconductor technologies. Perovskite tandem cells and especially perovskite-silicon multi-junction solar cells are explored as a promising concept to extend the ITR-PV roadmap in efficiency and costs. We have developed interfaces and electrodes for transparent perovskite devices, allowing to solution process devices with competitive performance. High IR transparent devices with efficiencies of over 17 % can be coupled to various types of silicon solar cells to give tandem devices with efficiencies as high as 26.7%. A simple lamination process is shown as an effective method to stack multiple devices on top of each other. To finally address the potential of perovskites for the field of optoelectronics, homemade perovskite displays for tablets are introduced, which can be fabricated within less than an hour by solution coating.

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He received his PhD (1995) in physical chemistry from Linz university, joined the group of Prof Alan Heeger at UCSB for a sabbatical, and continued to work on all aspects of organic semiconductor spectroscopy as assistant professor at Linz university. He joined the SIEMENS research labs as project leader for organic semiconductor devices in 2001, finished his habilitation in physical chemistry in 2003 at Linz university and joined Konarka in 2004, where he was holding the position of the CTO before joining Friedrich-Alexander University Erlangen-Nürnberg.