

Abstract Submitted
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Complete voltage recovery due to suppression of capture to quantum dots ANDREI SERGEYEV, KIMBERLY SABLON, U.S. Army Research Laboratory, Adelphi, MD 20783, USA, ALEX VARGHESE, MICHAEL YAKIMOV, VADIM TOKRANOV, SERGE OKTYABRSKY, SUNY Polytechnic Institute, Albany, NY, 12203, VLADIMIR MITIN, University at Buffalo - SUNY, Buffalo, NY 14260 — Decrease of the open circuit voltage in quantum dot (QD) solar cells with respect to the reference cell is an essential drawback of QD devices. Despite numerous efforts, the complete voltage recovery in QD cells has been demonstrated only at low temperatures. We propose and investigate a new approach that combines nanoscale engineering of band structure and potential profile. In this work we (i) fabricated and investigated GaAs solar cells with various nano-engineered InAs QD media, (ii) identified the key photocarrier processes responsible for the voltage reduction, (iii) optimized QD devices and demonstrated the complete voltage recovery with respect to the reference cell together with some improvements in the short circuit current.

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