

Abstract Submitted
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Role of radiative recombination in 1 eV GaInNAs solar cells IAN R. SELLERS, University of Oklahoma, WEI-SIN TAN, KATHERINE SMITH, STEPHEN DAY, STEWART HOOPER, MATTHIAS KAUER, Sharp Laboratories of Europe — High quality GaInNAs p-i-n solar cells with depletion widths in excess of $1\mu\text{m}$ for material absorbing in the practically important 1eV band gap regime are presented [1]. This is achieved through optimization of post-growth rapid thermal annealing at a temperature of $\sim 910^\circ\text{C}$. Despite the improvements in material quality evidenced by a low background impurity concentration and improved minority carrier collection, the external quantum efficiency remains limited to $\sim 50\%$. This is attributed to losses due to efficient radiative recombination in the bulk GaInNAs intrinsic region enhanced via localization of carriers in alloy fluctuations.

[1] Sellers *et al.* Applied Physics Letters **99**, 151111 (2011)

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