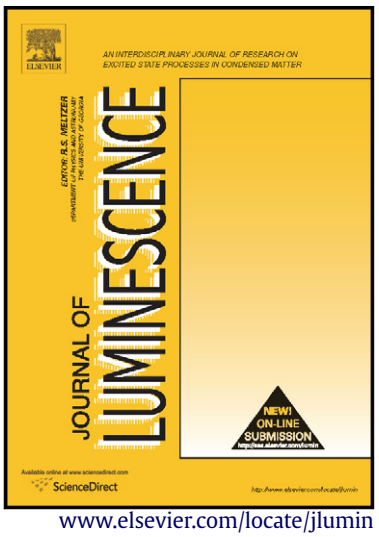

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Carriers' localization and thermal redistribution in post growth voluntarily tuned quantum dashes' size/composition distribution

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Abstract: This paper treats the impact of post growth tuned InAs/InP quantum dashes' (QDas) size/composition distribution on carriers' localization and thermal redistribution. The spread of this distribution depends on the experimental conditions used for the phosphorus ion implantation enhanced intermixing process. Atypical temperature-dependent luminescence properties have been observed and found to be strongly dependent on the amount of QDas size/composition dispersion. The experimental results have been reproduced by a model that takes into account the width of the QDas localized states distribution and consequent thermally induced carriers' redistribution. This model gives critical temperature values marking the beginning and the end of carriers delocalization and thermal transfer processes via an intermixing induced carrier's transfer channel located below the wetting layer states.

Keywords: Quantum Dash intermixing; ion implantation; Temperature-dependent Photoluminescence; localized state ensemble model