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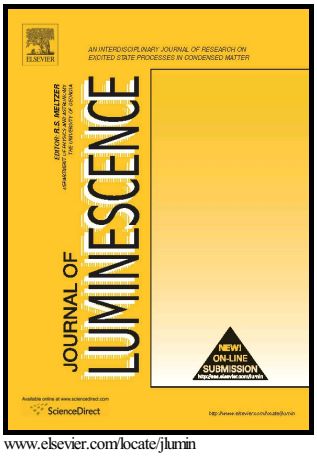

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T. Castro, D. Manzani, S.J.L. Ribeiro

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Up-conversion mechanisms in Er^{3+}-doped fluoroindate glasses under 1550 nm excitation for enhancing photocurrent of crystalline silicon solar cell

T. Castro[a*], D. Manzani[b], S.J.L. Ribeiro[a].

[a]Institute of Chemistry, São Paulo State University – UNESP, Araraquara, SP 14801-970, Brazil

[b]São Carlos Institute of Chemistry, University of São Paulo, São Carlos, SP 13566-590, Brazil.

[*]Corresponding authors: tarcioquimica@gmail.com / sidney@iq.unesp.br

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Abstract

In this work, Er^{3+}-containing fluoroindate glasses were synthesized by the conventional melt-quenching method varying Er^{3+} content from 0.1 to 7 mol%. The series of fluoroindate glass were investigated according to their luminescent properties. Upon excitation at 1550 nm, all glass samples showed green, red and near-infrared emissions centered at 550, 667 and 978 nm. Energy transfer upconversion (ETU) is the main mechanism responsible for the upconverted emissions and involves neighbour erbium ions. The highest near-infrared emission intensity at 1000 nm is observed for the glass sample containing 7 mol% of Er^{3+}, which was used to evaluate the photovoltaic response of monocrystalline and monofacial silicon solar cell. This approach represents a beneficial strategy to stud spectral modification in upconverter materials.

Keywords: Fluoroindate glasses, rare-earth, solar cell, photocurrent.

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