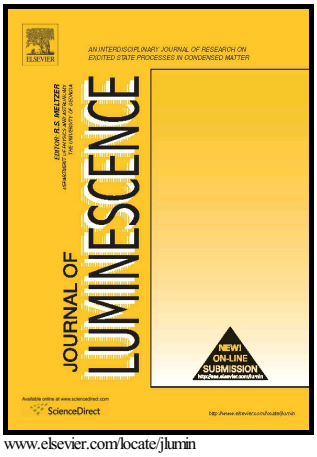
# Highly Luminescent and Stable Green-emitting In(Zn,Ga)P/ZnSeS/ZnS Small-core/Thick-multishell Quantum Dots

Misung Kim, Weon Ho Shin, Jiwon Bang




www.elsevier.com/locate/jlumin

PII: S0022-2313(18)31532-1
DOI: https://doi.org/10.1016/j.jlumin.2018.10.009
Reference: LUMIN15957

To appear in: *Journal of Luminescence*

Received date: 19 August 2018
Revised date: 22 September 2018
Accepted date: 1 October 2018

Cite this article as: Misung Kim, Weon Ho Shin and Jiwon Bang, Highly Luminescent and Stable Green-emitting In(Zn,Ga)P/ZnSeS/ZnS Small-core/Thick-multishell Quantum Dots, *Journal of Luminescence,* https://doi.org/10.1016/j.jlumin.2018.10.009

# Highly Luminescent and Stable Green-emitting In(Zn,Ga)P/ZnSeS/ZnS Small-core/Thick-multishell Quantum Dots

Misung Kim[1], Weon Ho Shin[2], and Jiwon Bang[*,1]

[1]Electronic Conversion Materials Division and [2]Energy & Environmental Division, Korea Institute of Ceramic Engineering and Technology, Jinju 52852, Republic of Korea.

*Corresponding authors: E-mail: jwbang@kicet.re.kr



**Abstract**

Fluorescent InP-based quantum dots (QDs) have attracted much attention as materials for display applications. Over the past few years, persistent effort has focused on improving photoluminescence (PL) quantum yields and narrowing PL bandwidths through synthesis; as a consequence, the PL properties of InP-based QDs are now comparable to of those of CdSe QDs. Unfortunately, the lack of PL stability in degradable environments has hindered investigations into the applications of these materials. Herein, we report the synthesis of green-emitting In(Zn,Ga)P/ZnSeS/ZnS small-core/thick-multishell QDs that exhibit 78% of the maximum PL quantum yield. Zn and Ga impurities in the InP-QD cores reduce the lattice constant of the InP QDs, which facilitates the growth of thick ZnSeS/ZnS shells. Due to protection of the QD exciton, which is spread away from the surface of the In(Zn,Ga)P/ZnSeS (core/shell) structure by the perfect passivating properties of the thick ZnS shell, the green-emitting In(Zn,Ga)P/ZnSeS/ZnS (core/multishell) QDs are significantly more photostable than In(Zn,Ga)P/ZnSeS QDs. A close-packed QD film displayed bright green (532 nm) emission with suppressed concentration quenching, which is useful for environmentally friendly QD-based displays.