

Abstract Submitted  
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**Studying nanoscale CuInSe<sub>2</sub> for high efficient tandem cell applications** AH REUM JEONG, RAN HEE SHIN, NURI LEE, WILLIAM JO, Department of Physics, Ewha Womans University — We report Cu(In,Ga)Se<sub>2</sub> nanoparticle-based cells using transparent conductive oxide back contacts. The structure is very important for next-generation tandem quantum-dot solar cells. The nanoparticles were synthesized by *in-situ* pulsed laser ablation and subsequently by a selenization process. X-ray diffraction, transmission electron microscopy, and atomic force microscopy of the nanoparticles were measured to study phase, crystalline information, chemical composition, and morphology. Optical characterization yielded transmission, bandgap shift, and absorption coefficient. Local current-voltage behaviors were also investigated with a contact-mode conducting scanning probe in dark and bright illuminating conditions. CdS buffer layers were found to be critical to obtain high external quantum efficiency (EQE) and energy conversion efficiency ( $\eta$ ). More than 20 % of EQE and 1 % of  $\eta$  were obtained and are now being improved.

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