

S2

DEVELOPMENT OF InGaN BASED THIN FILM SOLAR CELLS PRESENT STATUS AND CHALLENGES

Sidi Ould Saad Hamady^{1*}, Ahmad Sauffi Bin Yusof^{1,2}, Sourav Bose¹, Christyves Chevallier¹,
Nicolas Fressengeas¹, Queny Kieffer¹, Zainuriah Hassan², Mohd Anas Anas², Way Foong
Lim², Sha Shiong Ng²

¹*Université de Lorraine, CentraleSupélec, LMOPS, Metz, FRANCE.*

²*Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains
Malaysia, 11800 Penang, MALAYSIA.*

**Corresponding Author: sidi.hamady@univ-lorraine.fr*

ABSTRACT- The Indium Gallium Nitride (InGaN) alloy has the required potentialities to be a material of choice used in the next generation high efficiency solar cells. Indeed, the mere change in its Indium composition allows its absorption to cover the whole solar spectrum. The other main advantages of InGaN, in addition to its tunable bandgap, are a high absorption coefficient, a high stability and radiation tolerance. However, challenging issues remain to address: (i) the difficulty to elaborate sufficiently thick monocrystalline InGaN layers with a high Indium content; (ii) the high defects density and the spontaneous and piezoelectric polarizations; (iii) the p-doping which remains difficult to master. A review of this promising technology for solar cells is provided and present challenges and future perspectives are presented, including the use of InGaN multijunction structures and a new InGaN Schottky Based Solar Cells (SBSC) structure.

Keywords: Solar Cell, Photovoltaics, InGaN, Nitrides, Thin Film, Multijunction, Schottky, Elaboration, Characterization, Simulation, Numerical Optimization.