High Temperature InGaN-based Solar Cells

Arizona State University (ASU)

- PI: Yuji Zhao
- School of Electrical, Computer and Energy Engineering, ASU

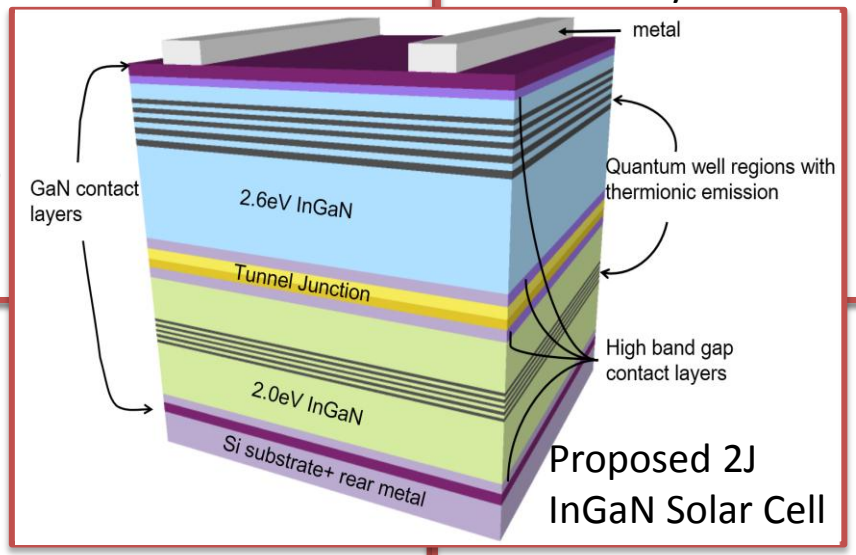
IRA A. FULTON SCHOOLS OF engineering
ARIZONA STATE UNIVERSITY

ASU MOCVD & GaN Lab

Email: Yuji.Zhao@asu.edu
Web: faculty.engineering.asu.edu/zhao

Research Objectives

- Develop InGaN solar cell with 25% efficiency at temperatures above 400°C
- Innovation in advanced MOCVD growth to suppress defects and novel device structure use thermal escape
- Proposed devices are advantageous in efficiency, scalability and feasibility compared to SOA



Proposed 2J InGaN Solar Cell

- Start TRL 2: Concept formulated in papers
- End TRL 3: Proof-of-concept devices

Approach

- MOCVD growth of InGaN
- Layer characterization
- Modeling and simulation
- Growth of tandem device
- Solar cell device fabrication
- Device testing
- Develop and demonstrate prototype of high temperature InGaN solar cell

Potential Impact

- NASA: enables a transformational change in the ability to efficiently generate power in space without concerns of operational temperatures
- Enable SMD missions focused on destinations closer to the Sun
- Other: enable integration of renewable energy into the electricity grid