

## Defects in Dilute Nitride Solar Cells

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Defects in crystal lattice can influence remarkably performance of semiconductor devices. Such parameters as background doping and nonradiative recombination rate are widely caused by defects. High-quality material with low defect densities is in key-role when fabricating high-efficiency multijunction III-V semiconductor solar cells. GaInNAs(Sb) is a promising material for high-efficiency multijunction solar cells. Well over 40 % conversion efficiencies have been demonstrated from molecular-beam-epitaxy grown three-junction solar cell with GaInNAsSb bottom junction [1]. However, relatively low growth temperatures and incorporation of N induces defects to the material, reducing its current and voltage generation [2]. Therefore, detailed knowledge about defects and their formation is essential when fabricating high-quality GaInNAs(Sb). We used capacitance spectroscopy to characterize defects in dilute nitride and antimonide materials. Defects and their influence on solar cell operation are discussed.

### References

- [1] Allen *et al.*, 9th International Conference on Concentrator Photovoltaic Systems , Japan (2013)
- [2] A. Aho *et al.*, Solar Energy Mater. Solar Cells **124**, 150-158 (2014)



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