

Ex-situ Spectroscopic Ellipsometry study for intrinsic layer

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Samples are deposited exactly as they would be measured for in-situ study.

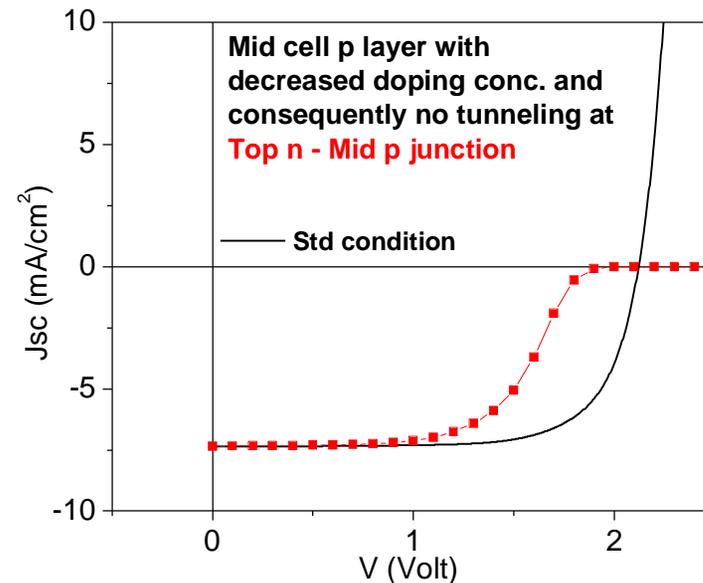
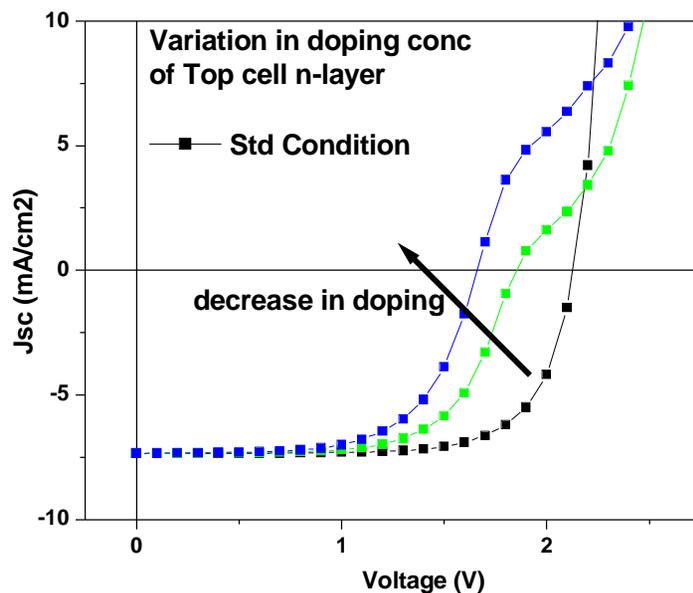
			time [Si ₂ H ₆]/[H ₂]
Roughness=127A		Roughness=111A	
i-nc-Si:H db= 1625 A, fc=69%, fa= 19%, fv=12%		i-nc-Si:H db= 1371 A, fc=82%, fa= 8%, fv=11%	t=37 min 1.7/200
		-----	t=22 min 1.4/200
		db= 1625 A, fc=69%, fa= 19%, fv=12%	t=15 min 1.0/200
n-a-Si:H	n-a-Si:H	n-a-Si:H	t=0 min
Glass	Glass	Glass	
		Roughness=126A	
		i-nc-Si:H db= 2210A, fc=70%, fa= 18%, fv=12%	

- **SE allows us to study the structural properties (a-Si, void, nc-Si volume fractions) at different level of growth.**
- **This particular data shows the effect of change in hydrogen dilution ratio for a i-ncSi layer deposited with graded dilution profile.**
- **By increasing the [Si₂H₆]/[H₂] ratio during growth, the trend to increase in fc has been suppressed.**
- **Applying the same for in-situ growth, we can exactly control the required structural property of the i-layer in near future.**

Computer modeling of failure scenarios for Triple-junction solar cell deposition process

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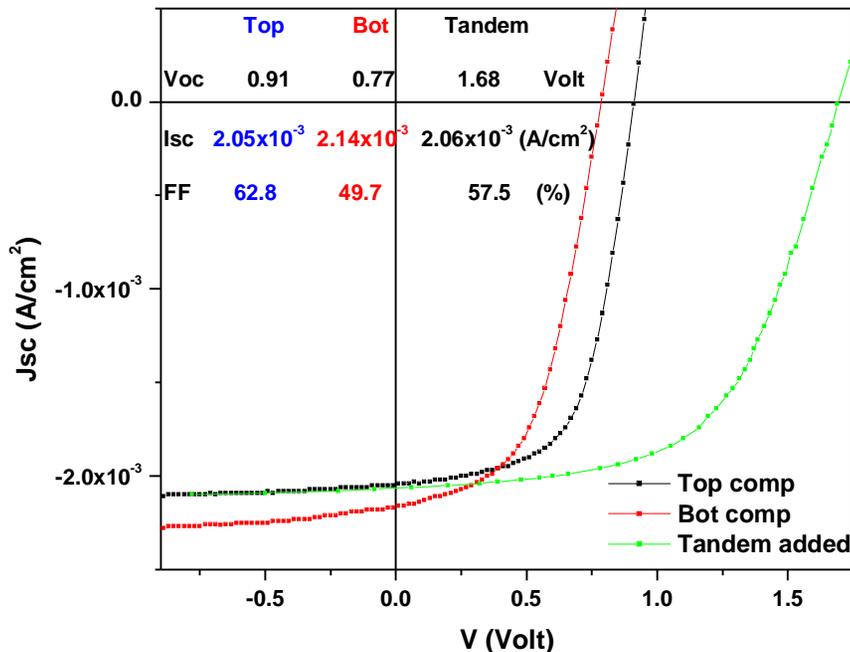
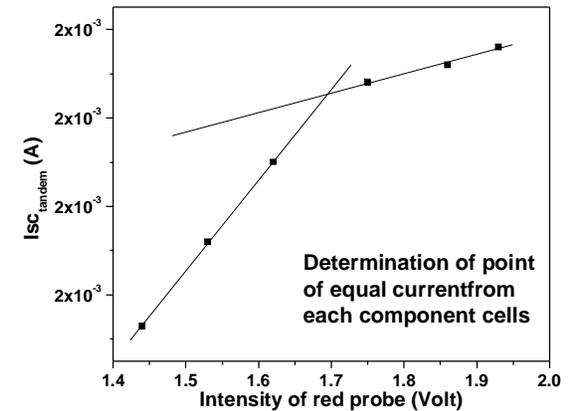
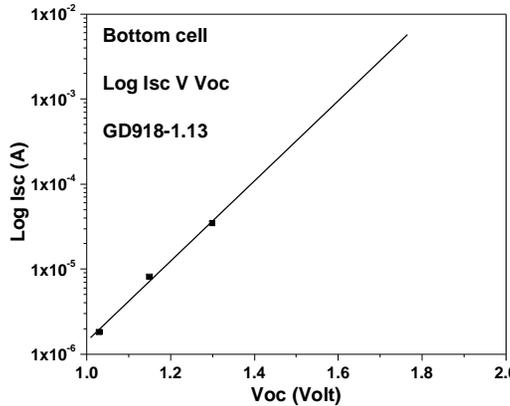
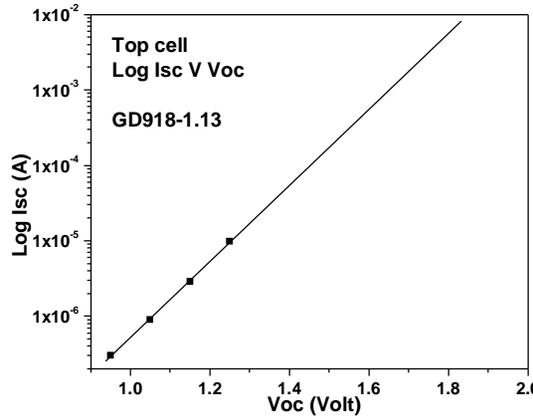
- Previously we presented failure cases in Triple junction solar cell deposition process associated with “variation in thickness” of individual semiconductor layers and verified with experimental results.
- Now we are presenting some failure cases associated with variation in **doping concentration** of doped layers.
- We have studied “n” and “p” layers for Top, Middle and Bottom junctions and presenting some of the representative and characteristic cases.



Variation in doping concentration of individual doped layers results characteristic features in I-V curves and could be recognized as finger-print of those failure cases.

Measurement of I-V characteristics of Top and Bottom component cells in a Tandem junction two terminal solar cell

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- I-V characteristics of tandem junction solar cell was measured under different wavelength restricted light biased condition.
- From $\log(I_{sc})$ vs V_{oc} relationship we deduced the actual V_{oc} from each component cells.
- Component I-V curves are added to construct the tandem I-V curve.