



Friday, June 21st, the sixth and final day of the PVSC and some of us are ready to go home and some of us are sad to see the conference end and to have to say goodbye again to friends and colleagues. There are no plenary or poster sessions on Friday at the PVSC so we jumped right into area oral sessions.

In a joint session between Area 1 and 6, Ken Nagamatsu presented his team's demonstration of Silicon/pedot:pss heterojunction solar cells with 12% efficiency that were fully processed using low temperatures. The use of silicon nanoparticles in polymer solar cell was shown to improve efficiency with best performance around 2 suns. Sushobhan Avasthi shared an interesting result using crystalline-silicon/titanium oxide heterojunctions with very low interface recombination velocity.



In the Area 3 orals on single-junction III-V cells, Stephen Bremner shared his modeling and early preliminary experimental results on planar PERL cells for integration in multi junction stacks. The primary interest of this work resides in understanding and controlling the interface recombination velocity (IRV), a noble, challenging endeavor. Chris Ebert presented optimized growth conditions for GaInP buffers, which included high growth rates suitable for low-cost manufacturing. Ryan France talked about his research studying dislocation glide in InGaP. Stephanie Tomasulo, a best student presentation award finalist, shared her research studying indirect/direct transitions on device performance for InGaP grown on GaP.

In Area 2, Bart Vermang presented a novel approach to back contacts to CIGS solar cells based on the PERL cell approach used in Si PV. He used precipitation of CdS nanoparticles from an overaged chemical bath deposition solution combined with atomic layer deposition of Al₂O₃ produced local holes in a dielectric layer on the back contact, resulting in a point contact CIGS cell. This device showed improved performance similar to the type of improvement that is produced in Si devices. Guido Roma described a density functional theory based model of chemisorption of Se, O, and Na on Mo. Later in the session Tim Gessert discussed the potential for 20% or higher CdTe solar cells and how to overcome the limitations faced by current devices.

The morning was rainy but during the break between sessions along the Riverwalk it was sunny (photo top). The sunshine provided an opportunity for networking outside the convention center (photo bottom right).



After the break Steven Ringel, an invited speaker in the joint session on advanced in III-V materials and devices, reported state-of-the-art developments regarding III-V/active-Si tandem solar cells. He showed that metal organic vapor phase epitaxy (MOVPE) growth of GaP on Si can generate dislocation free materials, owing this great result to a crystallographically faceted GaP/Si interface. He shared promising results of subcell fabrication and future plans for implementing a III-V tandem on active Si solar cells. Chloe Fabien presented dislocation-free 65% InGaN growth on GaN by a novel stepped-supply molecular beam epitaxy (MBE) approach. Jos Haverkort reported a nice improvement of InP nanowire solar cell performance attained through an ingenuitive sidewall cleaning approach. Pavel Dutta reported the growth of single-crystal GaAs on a flexible metal foil. Although the device performance is to be investigated, this type of technology could be a game-changer for low-cost and high-efficiency III-V cells.

Chris Chen presented the growth of InGaP on the tip of Si nanowires, aiming at demonstrating InGaP/Si dual junction nanowire solar cells. He obtained a lifetime of 1 nanosecond for InGaP, indicating that there is great potential to further improve nanowire 2-J solar cells. He intends to pursue this through the optimization of both structure design and crystal growth.

In Area 4 invited speaker Alan Carroll presented a comprehensive overview of the historical evolution of screen print metallization. He thoroughly explained how reducing the thickness of the glass at the metal silicon interface was a key to reducing the contact resistance on lightly doped surfaces.

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The last session in Area 2 included a presentation by Makato Konagai presented an approach to multijunction solar cells based on a variety of thin film materials and using a spectral splitting approach to getting light to each of them.



The conference drew wrapped up with the closing ceremony. Ryne (photo to left), this year's general conference chair, shared his humorous and informative perspective on the conference highlights and thanked his committee. The audience was reminded of the upcoming 6th World Conference in Kyoto, the European PVSEC conference and our own 40th PVSC that will take place next year in Denver Colorado, June 8-13, 2014. We hope to see you all there.

The awards for best student presentation, which is one of the most rewarding parts of the conference, were presented. The top student presenters in each of the 11 topical areas of the conference were recognized for their outstanding contributions to the PVSC conference. The winners are selected using rigorous criteria that include clarity of presentation, technical merit, and impact.

Congratulations to all of the winners! (Photo below)



I leave you with a couple of photos of sunset over Clearwater beach on Friday evening after the conference wrapped up to remind you of our conference in Tampa.

This concludes the daily highlights for the 39th IEEE PVSC conference. Many thanks go to Ryne Raffaele, the general conference chair, for pulling this fantastic event together. To all of the PVSC conference committee members, Cherry award committee members, conference chairs, student volunteers, and those working behind the scene, thank you for your contributions, this event would not have happened without you. I would also like to send a special thank you to John Meakin and Angus Rockett, our official conference paparazzi, for sharing their keen journalistic photography skills that helped capture the event in full. I couldn't ask for better partners. Lastly, to the entire PVSC community, we wish you a wonderful year of research and look forward to seeing you again next year at the 40th IEEE PVSC June 8 – 13, 2014 in Denver, CO.

~Rebekah Feist

