



American Perovskites

Pioneering Reliable Optoelectronic Materials for Perovskite Solar

Nicholas Denegre¹, Mahdi Ghaleni¹, Alex Brugh¹, Andrew Brose¹, Ian Woods¹, Alan Sellinger², Tijana Rajh³, Colin Bailie⁴

1. American Perovskites LLC, 2. Colorado School of Mines, 3. Arizona State University, 4. TandemPV



Who is American Perovskites LLC (AP)?

An early-stage startup company aiming to supply material for perovskite-based solar technology with production facilities in Tempe, Arizona.

We are driven by a passion for scientific innovation and a commitment to making a positive impact on the world.

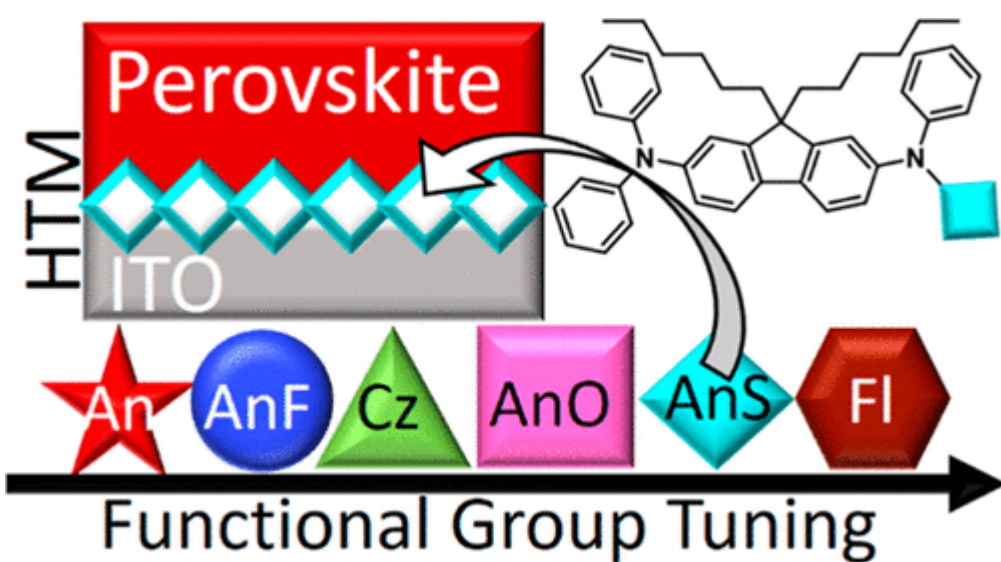
Our journey began with a simple but powerful idea: to harness the potential of perovskite materials, accelerate the manufacturing of solar cell semiconductors, and create a diversified and inclusive future workforce.

What is a perovskite solar cell?

Perovskite solar cells (PSCs) were developed about 15 years ago and can achieve higher power conversion efficiencies at lower cost compared to traditional solar cells.

What is a surface modifier?

Surface modifiers, like molecular passivators, help improve the material's stability, performance, and efficiency. These small molecules interact with the surface of the perovskite layer to reduce defects, improve charge transport, and protect the material from environmental factors like heat or light degradation.

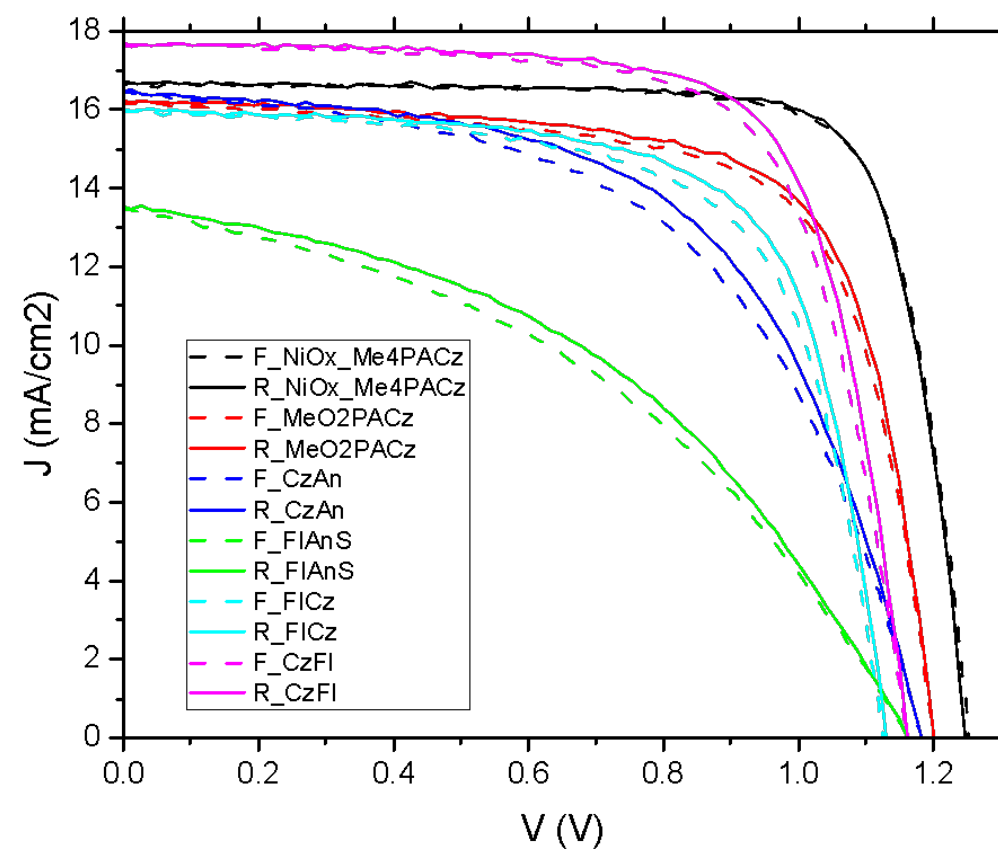


Why surface modifier materials?

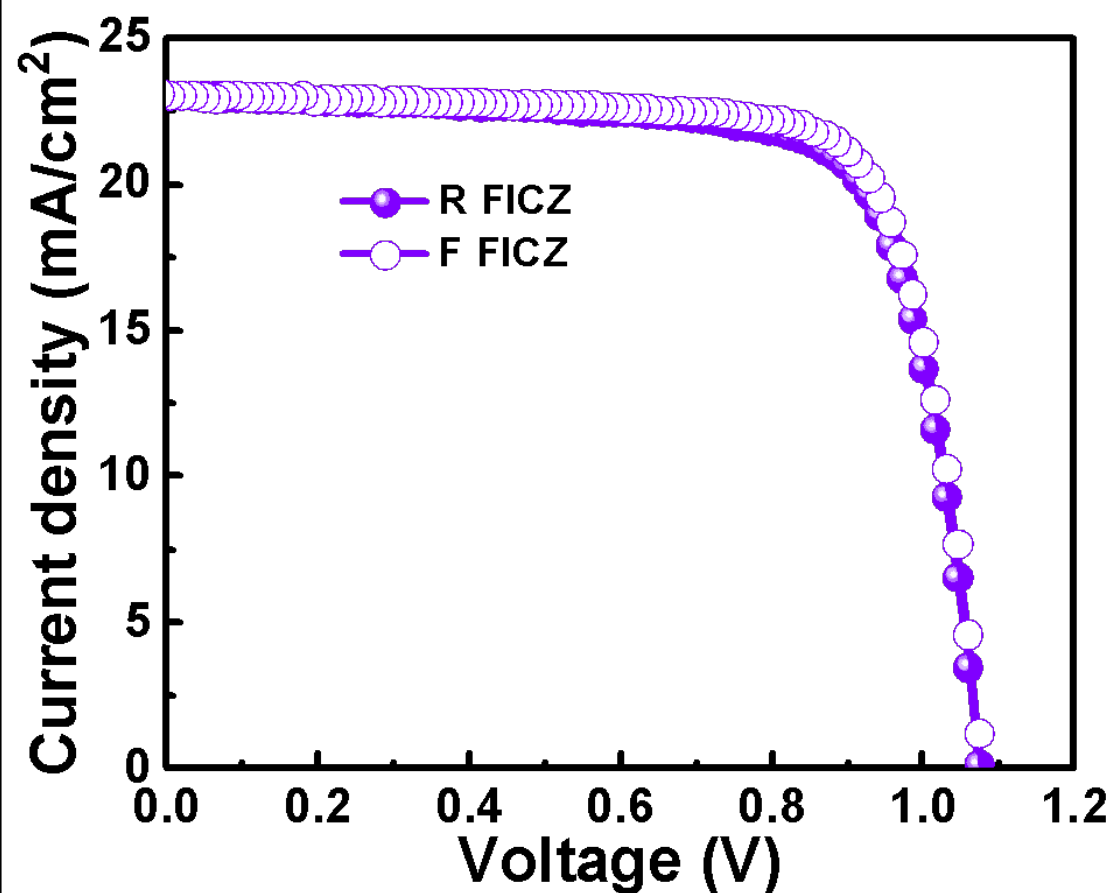
AP's surface modifier materials are important because they directly impact how well the solar cell functions. By reducing surface defects and improving the material's overall stability, surface modifiers help increase device efficiency and lifespan.

Device Performance of polymer hole transport material as of May 2024

- CzFL shows good performance for wide-bandgap (1.77 eV) PSCs.



- FICz show good performance for medium-bandgap (1.53 eV) PSCs



Solvent: Chlorobenzene, Concentration: 2 mg/mL Spinning speed: 3000 rpm

Future work

Within AP's commercialization framework, we will be scaling up a variety of high quality materials for deposition on larger area substrates, inventorying new materials (i.e., passivators and precursor inks), and advanced characterizations.

Our Story

The timeline shows the following milestones:

- 2006-2022:** Perovskite PV go from 2% to 26% efficiency with low-cost production.
- 2022:** Colorado School of Mines awarded \$200,000 DOE grant with UNC where PHTM provisional invention later licensed to AP occurred.
- 2023:** AP won DoE Countdown Contest \$200,000, licenses material, scales production, perform customer discovery.
- 2024:** AP wins Solar Prize 8 Ready! Contest \$50,000 and develops additional product lines at ASU.
- 2024-2028:** AP closes pre-seed round for in-house chemical synthesis (\$1.5M).
- 2025:** AP scales production and acquires purchase orders for market transformation and materials adopted in standardized PV cell semiconductors.
- 2026-2028:** MIPA.
- 2029:** American Perovskites.

AP originated from the idea to pursue scientific breakthroughs within perovskite solar cells.

Total funding to date: \$200,000 via American-Made Perovskite Startup Prize Countdown Contest

www.americanperovskites.com