Celebrating VIPERLAB's achievements in driving the EU's Perovskite solar cell research and innovation landscape

VIPERLAB Final Public event on 23 September 2024

Over the past three and half years, the VIPERLAB project has significantly advanced cooperation on the Perovskite PV topic through the development of a strategic research and innovation agenda and coordination of virtual and physical access to the main perovskite PV **research and infrastructures in Europe. In this context, the VIPERLAB Final Public event titled "Unveiling the future of Solar Energy with Perovskite PV", organised by PNO Innovation Belgium in collaboration with the VIPERLAB partners, was held at the 41ST European Photovoltaic Solar Energy (EU PVSEC) Conference and Exhibition Conference on 23 September 2024.**

The VIPERLAB event was opened by **Prof. Dr. Eva Unger**, Group Leader of Solution-Processing of Hybrid Materials and Devices at Helmholtz-Zentrum Berlin, and coordinator of the project. She welcomed all the participants and opened the event with an introduction to the VIPERLAB project, highlighting its role in advancing Europe's perovskite photovoltaics potential and the importance of a fully connected virtual and physical perovskite PV lab. Next, **Dr. Sjoerd Veenstra**, Project Manager at TNO & Solliance, presented VIPERLAB's collaborative research infrastructures, the use of its databases for tracking an increasing amount of available solar cell data and the need for standardisation and harmonization to compare results effectively. These collaborative research efforts where showcased with **user testimonial videos** of researchers who shared their experiences with VIPERLAB's

infrastructures. Then, **Prof. Dr. Rutger Schlatmann**, Head of Division Solar Energy at Helmholtz-Zentrum Berlin and chairperson of the ETIP steering committee on solar energy discussed the Strategic Research and Innovation Agenda (SRIA) for perovskite PV, focusing on the development of scalable manufacturing processes and the integration of this agenda within the larger framework of the European roadmap on solar energy. The final presentations was from **Ms. Maria Getsiou**, Senior expert in the Renewable Energy Sources Unit of the European Commission's Directorate General for Research and Innovation. She addressed the challenges and opportunities for PV in the EU's clean energy transition and explained how the Horizon Europe funding programme supports and prioritises research and innovation efforts in this field at the European level**.**

In a panel discussion moderated by **Dr. Nader Akil**, Operations Manager at PNO Innovation Belgium, the speakers and audience members engaged in a lively dialogue about the future of perovskite PV technology and the continuation of collaborative efforts beyond the VIPERLAB project. Below a summary of the discussed topics:

Disseminating vast amounts of research data

The VIPERLAB project has been instrumental in advancing research infrastructure and fostering exchange platforms. In the discussion, Prof. Unger emphasised the importance of perpetuating these infrastructures through new EU-funded projects with the aim to maintain and expand the database and research collaborations, ensuring the continuity of valuable research efforts. Datasets play a crucial role in advancing research by providing key information on experts, infrastructures, and research outputs. To address the need for better data dissemination, the Perovskite Database Project was created. This project focuses on automating the collection of solar cell data through collaboration with data mining experts, ensuring the availability of up-to-date datasets. Additionally, the project aims to overcome the lack of direct pathways for sharing lab-generated research data by developing alternative dissemination methods, enabling researchers to access valuable, well-managed data beyond the traditional peer-review process.

Dr. Veenstra also underscored the importance of maintaining the research collaborations and infrastructures developed by VIPERLAB for future projects. These collaborations are particularly crucial for projects aimed at scaling up to industrial processes, ensuring that research efforts translate into practical applications.

Another key point raised during the discussion was the role of the peer-review process. While it can be burdensome, it remains essential for maintaining the quality and integrity of research. Both, Prof. Unger and Prof. Schlattman suggested integrating peer-review into new dissemination pathways to maintain high standards of research.

Advancing perovskite PV towards the industry

A critical aspect of the project is its extensive network, which has been invaluable in fostering partnerships with industry stakeholders. This collaboration has played a key role in driving the project's success and ensuring its impact reaches beyond the research community. By providing access to research capabilities and directing industry partners to suitable infrastructures, VIPERLAB has strengthened the link between research and industry. This collaboration is essential for driving innovation and practical applications of research findings.

Equally important is the consideration of the **Perovskite-PV Strategic Research and Innovation Agenda** (SRIA-PV). In 2022, EERA-PV and ETIP-PV, after several discussion over a series of workshops with stakeholders, collected the main outcomes:

- Need of more emphasis on commercially available perovskite modules that have been produced in Europe and that are in line with the EU safety requirements (e.g., in terms of Pb content).
- The CO2-footprint Key Performance Indicator (KPI) was considered as one of the main differentiators compared to traditional Si-PV.
- The Levelized Cost of Electricity (LCoE) target was found to be unrealistic since this would require large-scale production of perovskite PV modules by 2030 at a similar scale as Si-PV production which is unlikely.

Based on this information, in early 2024, the SRIA-PV was updated with key insights from the VIPERLAB SRIA, reflecting the project's significant contributions to advancing photovoltaic research and innovation. Furthermore, the updated EU SRIA-PV will serve as the foundation for a new co-programmed partnership on Photovoltaics under Horizon Europe, set to begin in 2025, reinforcing Europe's commitment to driving sustainable energy solutions.

According to Prof. Schlattman, the SRIA-PV emphasises that while perovskite materials have advanced beyond typical semiconductors with electro-optical properties, they are not yet as developed as silicon technology, which has been in the market for decades. The agenda has highlighted essential topics, including the pursuit of lower bandgaps for stable perovskite-perovskite tandems, as well as the careful consideration of lead-containing materials and their health and safety aspects. As indicated by Prof. Schlatmann, the final SRIA publication will be released in **January 2025.**

Supportive measures and instruments of the EU

Looking at the broader picture, Ms. Getsiou outlined the EU's strategies to achieve the 2030 targets of 42,5% energy generation from renewables and 40% domestic clean-tec manufacturing (including PV), including national energy plans and the Net-Zero Industry Act (NZIA). According to Ms. Getsiou, the Horizon Europe Work Programme 2025 on Climate, Energy and Mobility is expected to be released in April 2025. And, perovskite will be a significant topic in the work programme, reflecting its importance in the future of renewable energy research.

In summary, Dr. Akil highlighted the significant achievements of the VIPERLAB project in developing essential research infrastructure, robust databases, platforms for knowledge exchange, and a SRIA. These contributions will not only support future EU-funded initiatives but also foster collaborative efforts across the sector. Ultimately, the project has set a strong precedent for the ongoing progression of Perovskite PV technology, paving the way for future innovations and collaboration between relevant actors from the value chain.

Watch the full event

Link to the video