

Preface: SiliconPV 2024, the 14th International Conference on Crystalline Silicon Photovoltaics

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The SiliconPV 2024 conference brought together nearly 300 scientists and engineers from 27 countries, with 142 abstracts approved by reviewers and presented through 61 oral talks and 71 posters, both onsite and online. 10 submissions were retracted. The conference served as a vibrant platform for exchanging knowledge, sharing ideas, and fostering collaboration among PV experts worldwide.

The silicon solar community is witnessing a remarkable period of progress and innovation. Single-junction silicon cells and modules continue to achieve significant advancements, even as they approach the theoretical efficiency limit. In recent months, new benchmarks have been reached for heterojunction and TOPCon devices, with cutting-edge strategies driving further progress. This momentum is even more evident in perovskite-on-silicon tandems, which have now achieved efficiency levels exceeding 34%.

Simultaneously, the growth in module production capacities remains robust, positioning the solar manufacturing sector to scale up to the terawatt level – a critical step toward addressing global warming. Bold plans for new gigafactories are taking shape worldwide, highlighting an era of expansion.

However, reaching terawatt-scale solar deployment brings its own set of challenges. Beyond manufacturing improvements, the key hurdles lie in ensuring solar technology matures into a fully sustainable industrial sector.

These themes – from pioneering concepts in single-junction and tandem cells to sustainable industrial solutions, from advanced silicon materials to high-quality, dependable modules, and from innovative manufacturing techniques to optimizing energy output and costs – were central to the discussions at the SiliconPV 2024 conference held in April, 2024, in Chambéry.

We are deeply grateful to the many experts who contributed to reviewing abstracts and full manuscripts, culminating in these valuable proceedings. These proceedings are not just a record of the event; they are a critical resource for the community. By exploring the insights and advancements documented here, we hope you will find inspiration to develop novel technologies that accelerate the energy transition. Together, we can shape a brighter future by ensuring clean and affordable energy is accessible to everyone.