

Fully Textured Perovskite/Silicon Tandem Solar Cell Architecture for the PV Industry

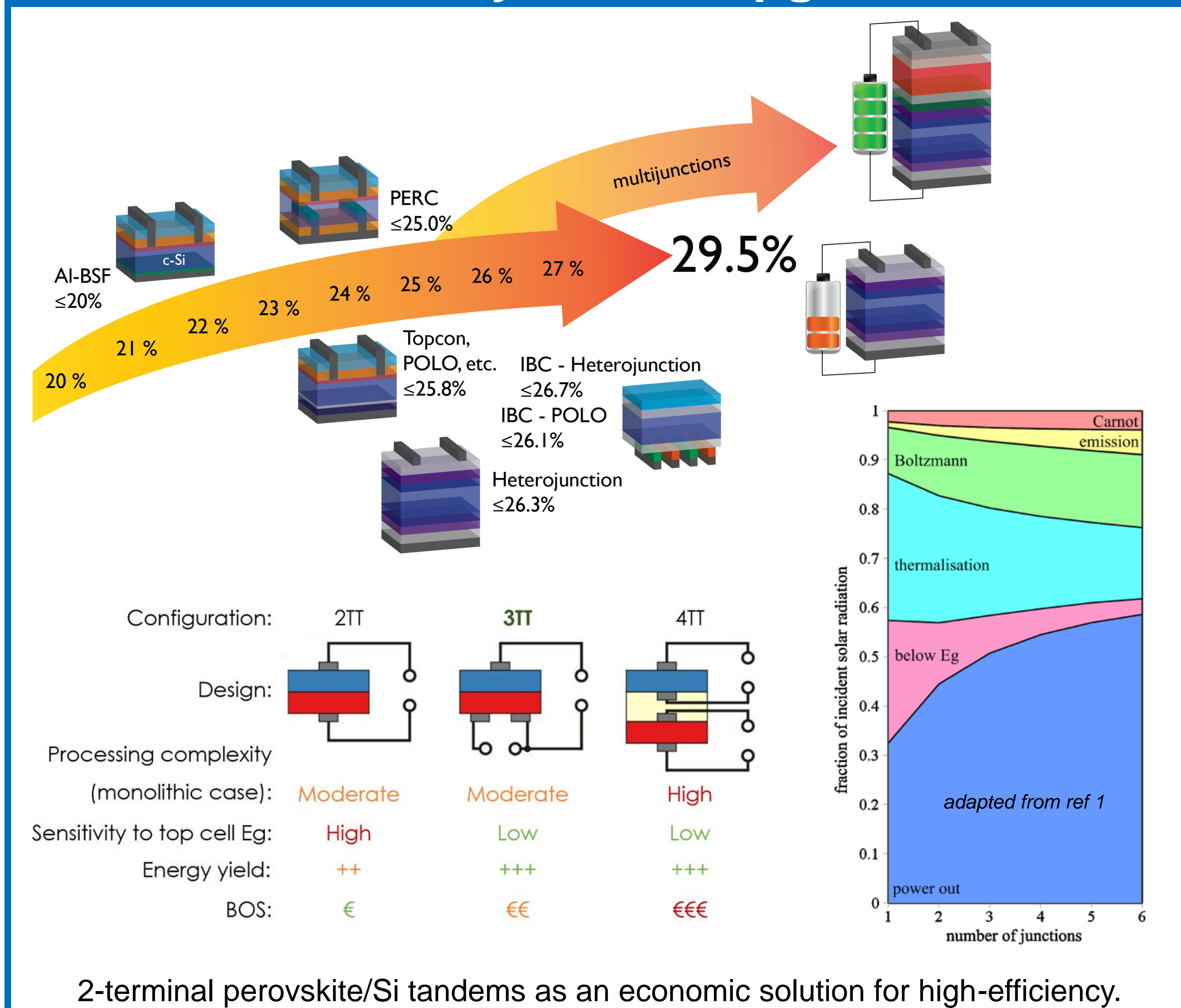
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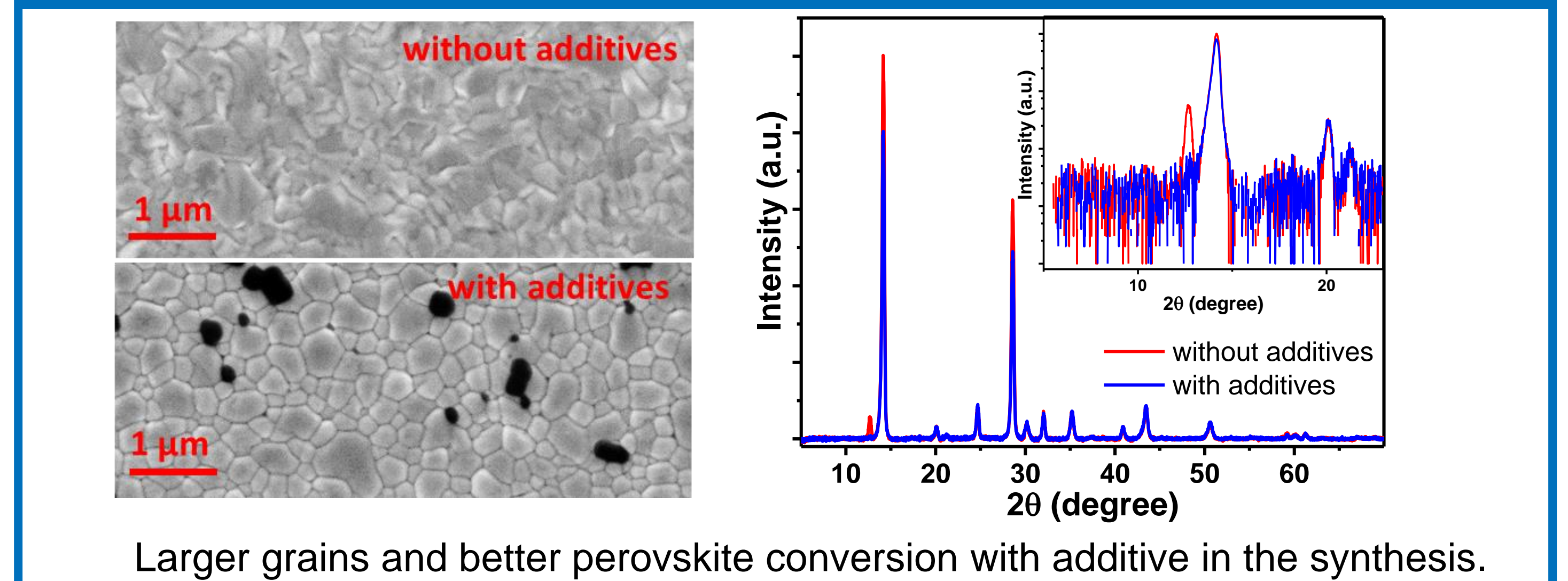
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Abstract. Silicon solar cells are approaching their maximum power conversion efficiency limit of about 29%, which will eventually slow down the progress of photovoltaics. However, this limitation can be overcome by using advanced device designs that stack multiple solar cells into a single device to maximize the use of solar energy. In this study, we propose an improved tandem device that combines a perovskite layer with a silicon bottom cell that features micrometric pyramids for optimal optics, as commonly used in the silicon PV industry. By using a specific additive during the manufacturing process, we are able to tune the perovskite crystallization process and reduce losses that occur at the interface between the perovskite layer and the electron-selective contact. Our device, with a total active area of 1.17 cm², achieve a **certified power conversion efficiency of 31.25%.** These results show a path on how to **upgrade industrial silicon solar cells with a perovskite to boost performance.**

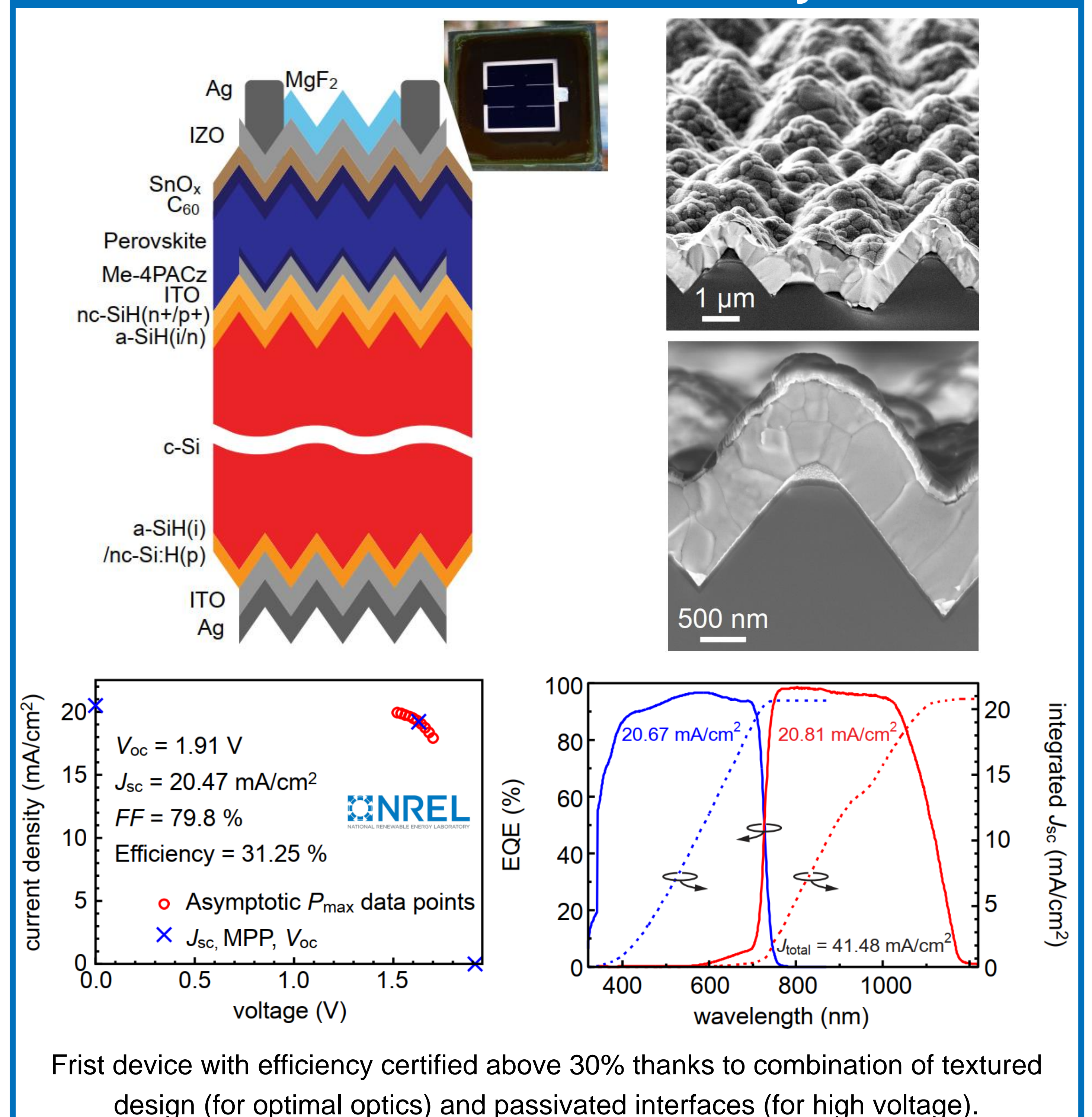
Efficiency Driven Upgrade



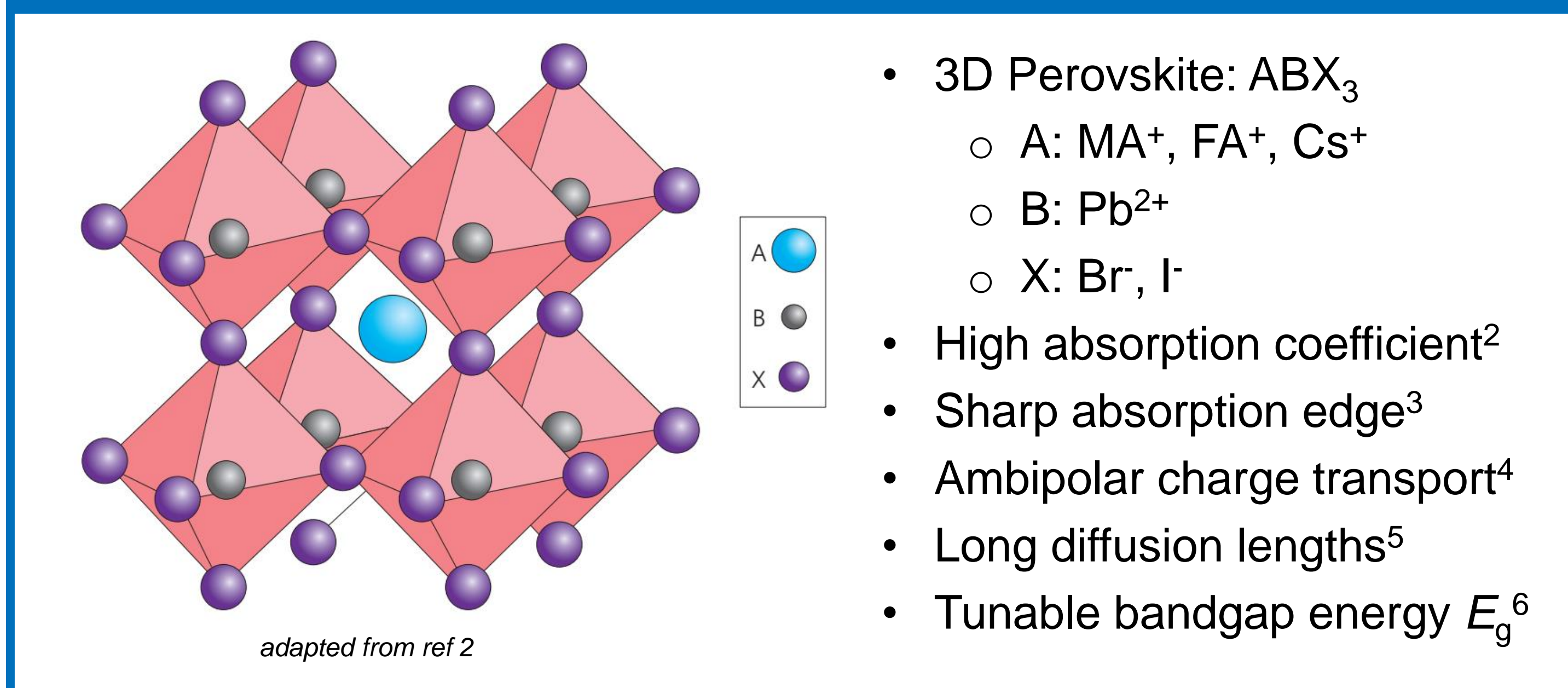
Additives-assisted Growth



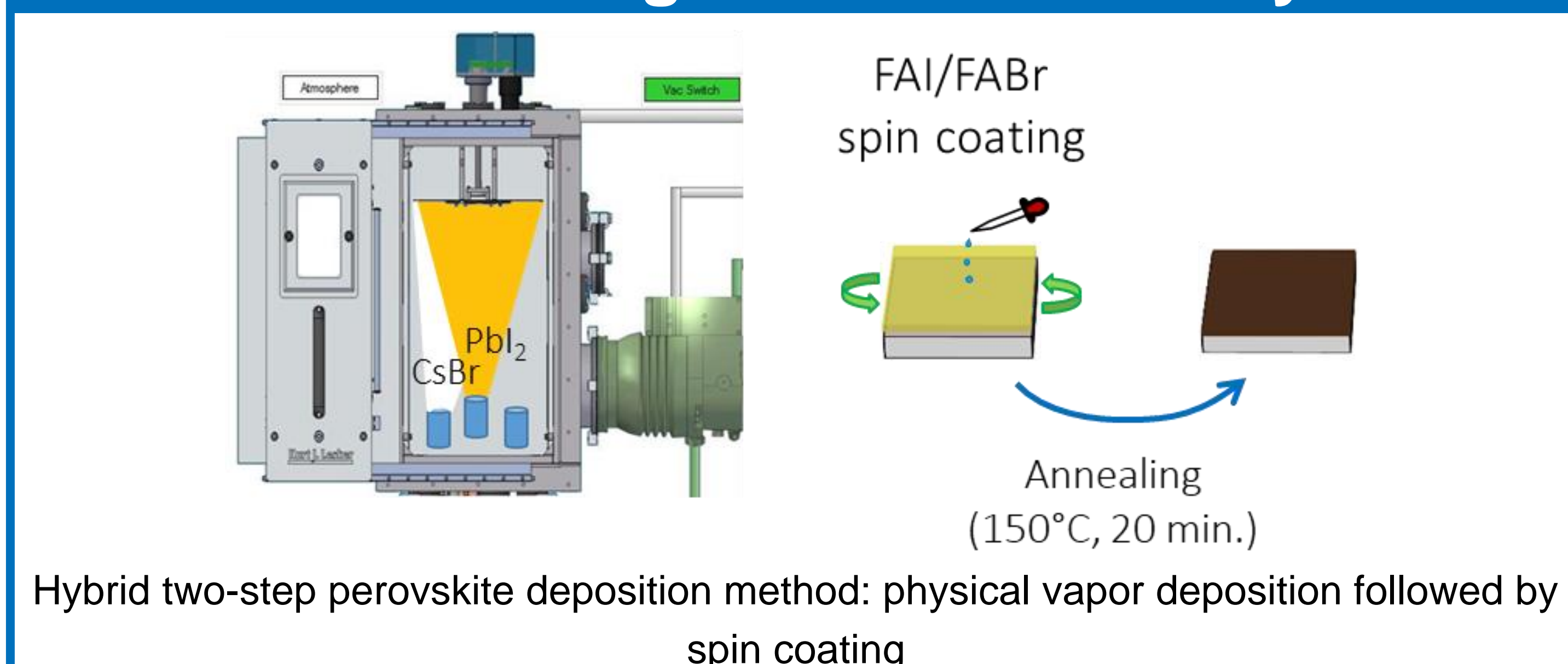
Best Certified Efficiency



Metal Halide Perovskites



Conformal Coating on Micrometric Pyramids



References

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