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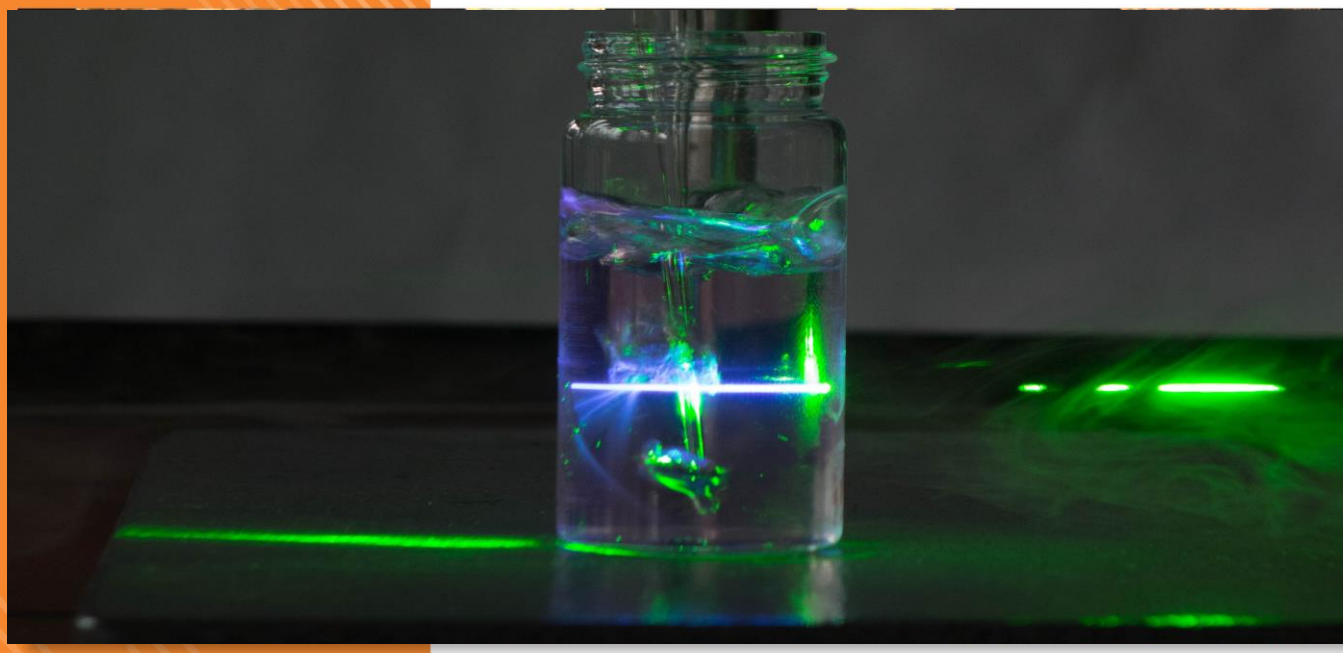

The Promise of Halide-Perovskite Solar Photovoltaics

Prof. Dr. Nitin P. Padture
Otis E. Randall University,
School of Engineering,
Initiative for Sustainable Energy,
Brown University,
Providence, RI 02912,
USA

Renewable electricity from solar photovoltaics (PV), combined with low-cost large-scale storage, is likely to play a dominating role in decarbonizing the expanding global power sector. For example, the global deployment of PV is targeted at ~75 TW installed capacity by 2050, from today's ~2.5 TW. While currently used PV technologies are efficient, reliable, and relatively cheap, there is, and always will be, insatiable demand for new PV technologies that are more efficient and cost-effective, and importantly, have a smaller 'carbon-footprint.' In this context, the promising new PV technology based on a fascinating class of halide-perovskite materials has the potential to meet all those requirements.

Perovskite thin-film PV can be mechanically rigid or flexible, where the latter lightweight PV are more versatile with the potential to power internet-of-things, vehicles, satellites, portable supplies, *etc*., in addition to rooftop and utility-scale applications. While the record power-conversion efficiency of perovskite PV now rivals that of conventional silicon PV, durability and mechanical reliability are becoming 'bottleneck' challenges in perovskite PV. To address some of these technical hurdles in the path towards their commercialization, we have researched several rationally-designed approaches, which include engineering of interfaces and substrates. Most importantly, these approaches are designed to not only enhance the PVs' mechanical performance but also increase efficiency and improve durability simultaneously. The scientific rationales for these approaches will be discussed, together with the presentation of current results.

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Hörsaal FZH3
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