**Simple yet efficient fabrication process to improve the stability of perovskite solar cells**

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Perovskite solar cells have achieved high efficiencies of 26.1% for single-junction cells and 33.7% for tandem devices with silicon solar cells in small areas, thanks to advances in materials and processes. However, for commercialization of solar cells for power generation, material and device technologies that enhance long-term stability against degradation factors such as heat, moisture, and oxygen, as well as encapsulation technologies to protect devices from these factors, are required. To suppress the influx of degradation factors and diffusion of iodide ions or electrode metals through the perovskite surface, barrier layers and rigid encapsulation are necessary. Additionally, the processes for these technologies should be simple, reproducible, and cost-effective.

This paper presents novel, yet simple methods to protect perovskite solar cell materials and devices from degradation. A self-sealing device formation technology through hot-pressing lamination provides an effective way to achieve glass-to-glass encapsulation. We analyzed bonded interfaces and demonstrated superior stability of thermocompressive bonded perovskite solar cells. Additionally, we present novel solution processes to form an inorganic buffer and to passivate the surface of the perovskite. These methods improve not only power conversion efficiency but also long-term stability of perovskite solar cells.