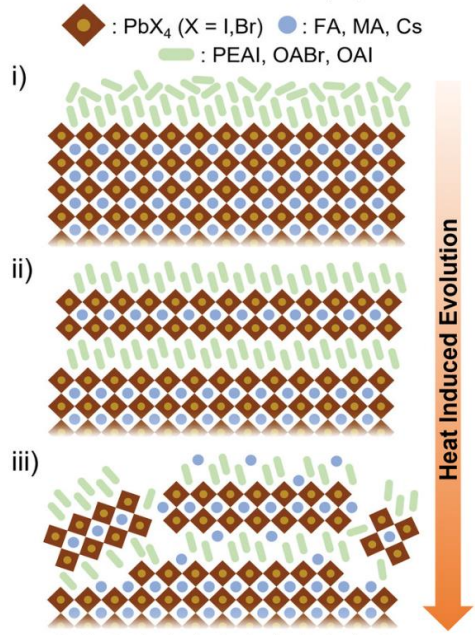


Cation Treatment Impacts Stability of Perovskite Solar Cells



Schematics of the evolution of the interface treated with bulky cations upon annealing: i) Formation of an organic overlayer; ii) bulky cation diffusion and metal halide Ruddlesden–Popper (RP) phase formation; iii) RP reconstruction.

C. A. R. Perini, E. Rojas-Gatjens, M. Ravello, J. Hidalgo, Y. An, S. Kim, B. Lai, R. Li, J.-P. Correa-Baena, A.-F. Castro-Mendez, C. Silva-Acuña. *Adv. Mats.* **2204726** (2022).

This work was performed at Brookhaven National Laboratory.

Scientific Achievement

Scientists discovered that the bulky cation interface of perovskite solar cells impacts their stability when the solar cell is heated above 50 C, reducing their performance.

Significance and Impact

Halide perovskite are a promising material for photovoltaics. However, the cation interface used on actual devices is underexplored. This study found that these interfaces can impact the stability of solar cells.

Research Details

- Used the CMS beamline at NSLS-II.
- Investigated the thermal stability of bulky cation layers based on organic salts, which are used to treat surfaces of perovskite films.
- Demonstrated that cations diffuse into the perovskite layers during heat treatment and cause changes in the structure.
- The layer becomes less effective against air and moisture.
- Material performances decrease suddenly within the first 200h of operations and then stabilizes.