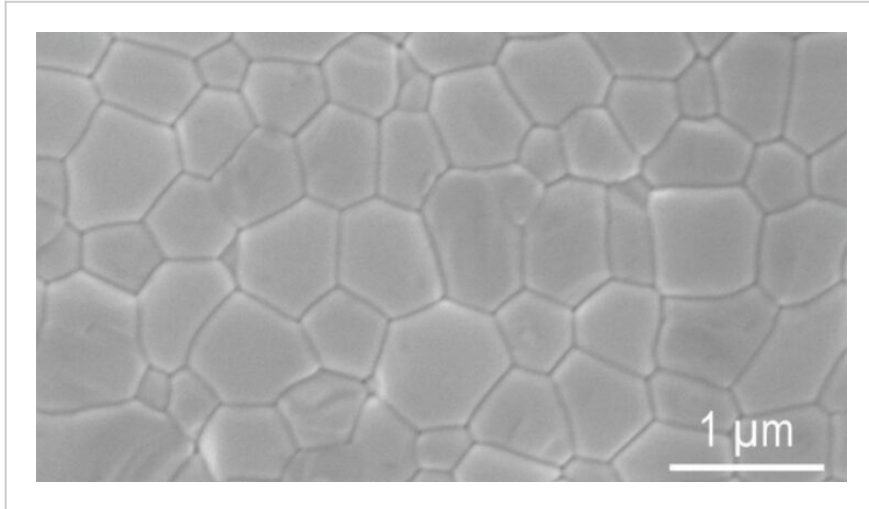


Isothermally Crystalline Perovskites at Room Temperature

ID# 2020-5122



Top View of RT-isothermal crystallization.

Technology Summary

This innovation introduces a new method to spontaneously crystallize perovskite at room temperature within seconds, without needing post-treatments like annealing or vacuum treatment. By discovering a metastable intermediate formed by amine-assisted lattice expansion, along with rapid solvent evaporation, high-quality perovskite films are created quickly. These films, exhibiting $\{00l\}$ preferred orientation, demonstrate compatibility with both conventional and inverted devices, achieving power conversion efficiencies of 22.3% and 23.1% respectively. The inventors believe this method offers a simpler route for perovskite synthesis, with potential applications beyond solar cells.

Application & Market Utility

The inventors believe that their process of isothermally crystallizing high-quality perovskite films at room-temperature imparts attractive optoelectronic features such as large light-extinction, long carrier lifetimes and high charge carrier mobilities, making them excellent candidates for photovoltaic (PV) applications. There is continuous need to obtain PVs with low levelized-cost-of-electricity (LCOE) and simplified environment-friendly manufacturing techniques.

Next Steps

Inventors aim to explore different amines and solvents, expanding universality to more perovskites for future opportunities.

TECHNOLOGY READINESS LEVEL

5-7

Seeking

Licensing |

Keywords

- Semiconducting Materials
- Halide Perovskite Materials
- Isothermally Crystallized RT Perovskite Ink
- Isothermal Crystallization
- Solar Cells

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