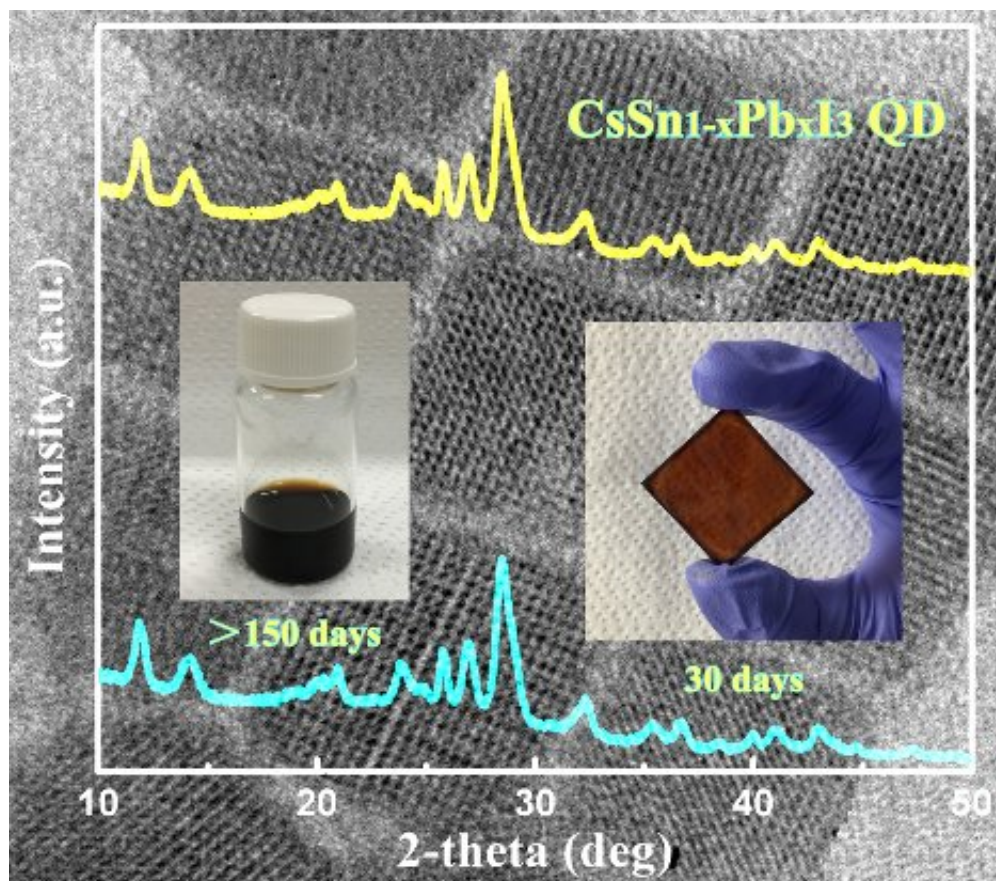


# Researchers report phase-stable inorganic halide perovskite

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Stable CsSn<sub>1-x</sub>Pb<sub>x</sub>I<sub>3</sub> perovskite nanocrystals. Credit: University of Electro Communications

CsSnI<sub>3</sub> is a prototype inorganic halide perovskite that has recently been proposed as a strong candidate for photovoltaic applications because of

its unique properties as a semiconductor.

However, pure Sn perovskites are extremely unstable, quickly losing their single crystallinity and degrading into inactive phases on exposure to air in less than five minutes.

Now, Qing Shen and colleagues at University of Electro-Communications, Tokyo, report that alloying CsSnI<sub>3</sub> nanocrystals (NCs) with CsPbI<sub>3</sub> significantly improves the [phase](#) stability of the Sn perovskites.

The alloyed CsSn<sub>1-x</sub>PbxI<sub>3</sub> NCs (particle size 10~15 nm) were synthesized using a scalable hot-injection method recently developed by Shen et al. where a mixture of SnI<sub>2</sub> and PbI<sub>2</sub> is dissolved in trioctylphosphine and rapidly injected into an octadecene solution containing Cs precursor at 120 to 170 °C. The reaction was allowed to proceed for approximately 5 s, after which it was rapidly cooled to room temperature. The resulting NCs were precipitated with methyl acetate and redispersed in hexane.

Notably, the resulting phases of the alloyed NCs can be stable for months, and far more superior to the parent CsSnI<sub>3</sub> (

The successful synthesis of these stable Sn/Pb perovskites opens up new opportunities to improve the stability of other amazing but susceptible [perovskite](#) materials, and further expands their possibilities for practical applications.

**More information:** Feng Liu et al. Colloidal Synthesis of Air-Stable Alloyed CsSn<sub>1-x</sub>PbxI<sub>3</sub> Perovskite Nanocrystals for Use in Solar Cells, *Journal of the American Chemical Society* (2017). [DOI: 10.1021/jacs.7b08628](#)

Provided by University of Electro Communications

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