

# Energy Conversion

**R&D Project Title :** Highly efficient and durable Lead-free metal halide perovskite solar cells with orientation-controlled two-dimensional structure

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## Summary :

Perovskite solar cells are expected as the next generation solar cells to contribute to carbon neutrality. Our goal is to achieve Pb-free perovskite solar cells with high efficiency and high durability by utilizing Sn-based compounds and two-dimensional (2D) structures.

Pb-based 3D perovskite compounds are mainly used in solar cells, but low stability and usage of Pb should be overcome for commercialization. Although replacement with Sn-based 3D compounds has been considered,  $\text{Sn}^{2+}$  is easily oxidized and is even more unstable than Pb-based 3D compounds. In the proposed research, we will utilize 2D compounds and fabricate solar cells with a structure that has enhanced carrier mobility and a different absorption wavelength range by controlling organic amines and the film formation method.

The utilization of Pb-free perovskite solar cells, their use on building roofs, side walls, and windows is expected to contribute to  $\text{CO}_2$  reduction and carbon neutrality.

