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Working to Get the Lead out of Perovskite Solar Panels

Over the past decade, innovations have been underway to improve the performance of solar panels. One of the most promising innovations is the use of perovskites. A major downside is the fact that perovskite solar panels cells are made with Lead (Pb), which is highly toxic. Scientists are working to get the lead out.

In 2014, a group of European scientists from Oxford and elsewhere reported that they were able to substitute tin for lead and achieved efficiencies of over 6% under 1 sun illumination. Scientists at National Chia Tung University in Taiwan achieved 10% efficiency and greater stability with tin-based perovskite cells in 2019.

Now, in a study published in Nature Energy in February 2023, research by scientists from Nanyang Technological University (NTU Singapore) and others have synthesized a capping layer that does not contain lead. Perovskite solar cells are made of several layers of materials, including a perovskite layer that harvests light and a protective capping layer and both typically contain lead.

A zinc-based compound used a capping material did not draw lead ions up from the underlying perovskite layer and was more effective than the traditional method at fabricating the capping layer. The perovskite cell reportedly has a conversion efficiency of 24.1% under lab settings. The prototype demonstrated an average light conversion rate of almost 23% over 103 cells tested. It maintained more than 90% of its ability to convert light into electricity for more than 1,000 hours of operation at full capacity.

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