PEROVSKITE PHOTOVOLTAICS

Readily bioavailable

Nat. Commun. **11**, 310 (2020)

Lead halide perovskite solar cells contain less than 0.1% by weight of lead. Even in the case that a perovskite module releases all its lead content into the environment, the final concentration of the metal in the soil is likely to be below the regulatory limits imposed by several countries. However, lead salts used in perovskite solar cells are relatively soluble in water and hence are potentially bioavailable to living organisms. The actual implications of soil contamination from perovskite solar cells for the environment and human health are not well documented. Now, Mingdeng Wei, Jian Lü, Antonio Abate and colleagues in China, Italy and Germany show that the lead uptake ability of plants for soil contaminated with perovskite is 10 times higher than for other lead contaminants.

Under laboratory conditions, the researchers measure the absorbance of lead released from perovskites or halide salts by mint plants. They find the plants more easily absorb the lead leaked into the soil from a perovskite solar cell as the organic cations used in the perovskite formulation influence the soil's pH. Heavy metals ions such as lead are more mobile in acidic soils and hence become more bioavailable. The same experiments repeated for tin-based perovskites, instead, show no substantial difference in the tin uptake ability of plants for soil contaminated with tin leaked from perovskite or other sources. While these preliminary results suggest that tin perovskite may be a safer option, further comprehensive assessments of the environmental impact of perovskite solar cells are needed before placing the technology on the market.

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Published online: 18 March 2020

<https://doi.org/10.1038/s41560-020-0592-y>