

Recycling Car Batteries for Efficient Perovskite Solar Cells

Technology #16861

Applications

- Perovskite Solar Cells

Problem Addressed

Organolead halide perovskite solar cells (PSCs) show great promise as a new large-scale and cost-competitive photovoltaic technology. Power conversion efficiencies over 15% to 19% have been achieved within 18 to 24 months of development; as a result, perovskite materials have attracted great attention in photovoltaic research. However, the manufacture of PSCs raises environmental concerns regarding the over-production of raw lead ore, which has harmful health and ecological effects.

Technology

This invention encompasses an environmentally responsible process to fabricate efficient PSCs by reusing car batteries to simultaneously avoid the disposal of toxic battery materials and provide alternative, readily available lead sources for PSCs. Materials are first harvested from the anodes and cathodes of car batteries. Lead iodide is synthesized from the harvested materials and is subsequently ground for further synthesis into lead iodide perovskite nanocrystals. The lead iodide perovskite nanocrystals are then deposited onto TiO₂ films and the films are processed further to fabricate the solar panels for the PSCs.

Advantages

- Environmentally friendly
- Avoids disposal of toxic battery materials
- Provides alternative, readily available lead sources for PSCs
- Shows same material characteristics and identical photovoltaic performance as perovskite films assembled using materials from high-purity commercial reagents

Categories For This Invention:

Energy
Solar
Photovoltaics
Perovskite

Intellectual Property:

Recycling car batteries for perovskite solar cells
Issued US Patent

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Recycling car batteries for efficient perovskite solar cells
US Patent Pending

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Publications:

[Turning Old Lead Batteries into New Solar Energy](#)

Popular Science

August 20, 2014

[Recycling Old Batteries into Solar Cells](#)

MIT News

August 18, 2014

[Old Car Batteries Could Make Cheaper, More Efficient Solar Panels](#)

The Washington Post

August 18, 2014

[Environmentally Responsible Fabrication of Efficient Perovskite Solar Cells from Recycled Car Batteries](#)

Energy & Environmental Science

July 23, 2014

External Links:

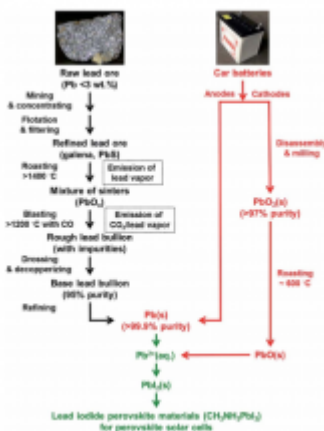
Hammond Lab

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Biomolecular Materials Group

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