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From: Doe/Lawrence Berkeley National Laboratory via EurekAlert!
Published July 4, 2016 01:26 PM

Discovery could dramatically boost efficiency of perovskite solar cells

Scientists from the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) have discovered a possible secret to dramatically boosting the efficiency of perovskite solar cells hidden in the nanoscale peaks and valleys of the crystalline material.

Solar cells made from compounds that have the crystal structure of the mineral perovskite have captured scientists' imaginations. They're inexpensive and easy to fabricate, like organic solar cells. Even more intriguing, the efficiency at which perovskite solar cells convert photons to electricity has increased more rapidly than any other material to date, starting at three percent in 2009 -- when researchers first began exploring the material's photovoltaic capabilities -- to 22 percent today. This is in the ballpark of the efficiency of silicon solar cells.

Now, as reported online July 4, 2016 in the journal Nature Energy, a team of scientists from the Molecular Foundry and the Joint Center for Artificial Photosynthesis, both at Berkeley Lab, found a surprising characteristic of a perovskite solar cell that could be exploited for even higher efficiencies, possibly up to 31 percent.

Using photoconductive atomic force microscopy, the scientists mapped two properties on the active layer of the solar cell that relate to its photovoltaic efficiency. The maps revealed a bumpy surface composed of grains about 200 nanometers in length, and each grain has multi-angled facets like the faces of a gemstone.

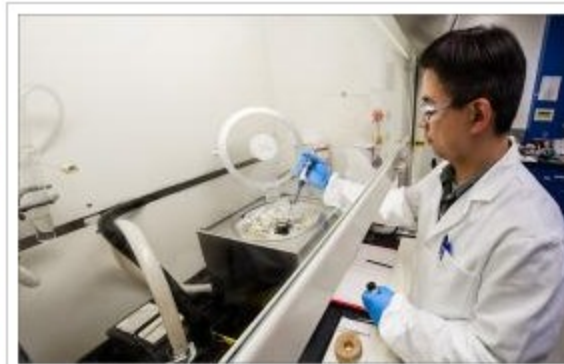
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Image: Preparing a perovskite solar cell via [NREL](#)

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