Researcher helps classify new means of renewable light energy

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Purdue professor Jeff Miller worked with researchers from the University of California, Los Angeles to characterize extremely small titanium dioxide that could help convert visible light into renewable energy.

On its own, titanium dioxide captures ultraviolet light but not visible light, leaving out half of the solar spectrum. UCLA researchers discovered that adding boron oxide to titanium dioxide resulted in nanoparticles capable of absorbing a wider range of light to be transformed for electricity and other energy uses.

Miller's group helped the researchers to understand how titanium dioxide's size and structure played a role in its ability to capture visible light.

"When you go to very, very small sizes, it changes the fundamental properties of a particle," said Miller, a professor in Purdue's Davidson School of Chemical Engineering. "But the size is what gave titanium its unique properties."

Findings published on March 5 in *Nature Materials*. The next steps would be fabricating the modified titanium dioxide into solar arrays to capture and transform light into useful energy.

"Titanium dioxide has always been intensively investigated for solar capture, but it's never been able to find widespread commercial use

because it only captures a small fraction of the light. Now that it can capture a larger fraction of the light, it's going to be more efficient for the production of solar energy applications," Miller said.

More information: Dahee Jung et al. A molecular cross-linking approach for hybrid metal oxides, *Nature Materials* (2018). DOI: 10.1038/s41563-018-0021-9

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