Next-gen solar cells spin in new direction: Phosphorene shows efficiency promise
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"Phosphorene is an exciting material because it is a good conductor that will absorb visible light. In the past most non-metallic materials would have one property but not both," he says.

"We've found exciting new way to convert exfoliated black phosphorus into phosphorene which can help produce more efficient and also potentially cheaper solar cells," says Dr. Christopher Gibson, from the College of Science and Engineering at Flinders University.

"Our latest experiments have improved the potential of phosphene in solar cells, showing an extra efficiency of 2%-3% in electricity production."

Research into making high quality 2-D phosphorene in large quantities—along with other future materials such as graphene—are paving the way to more efficient and sustainable production with the use of the SA-made VFD, near-infrared laser light pulses, and even an industrial-scale microwave oven.

"The work with phosphorene is exploring the addition of different atoms to the matrix which is showing very promising results in catalysis, particularly in the area of water splitting to produce hydrogen and oxygen," says Professor Shapter.

With the ability to artificially produce perovskite structures, commercial viability is at the threshold and not too far away once the cells can be successfully scaled up. Meanwhile research around the world continues to look for ways to improve and optimise perovskite cell performance.
