SOLAR CELL MATERIAL MOONLIGHTS AS LASER

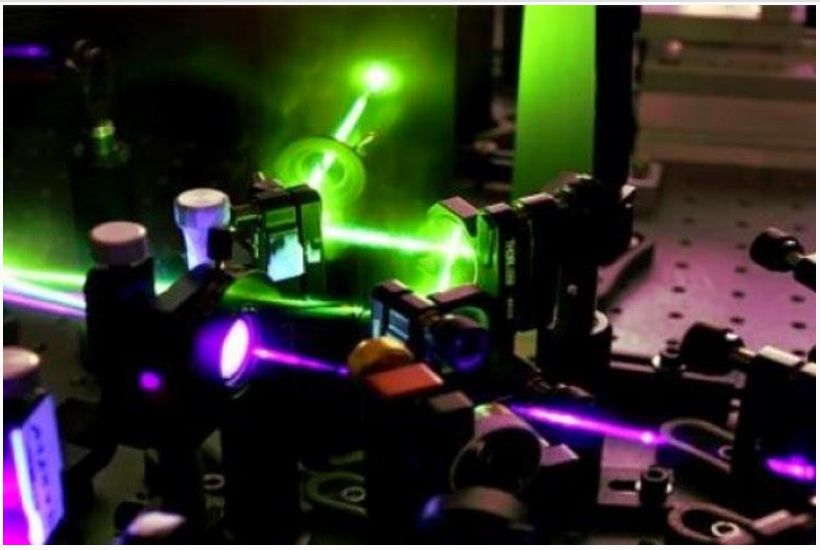

Photo credit: Revolutionary solar cells double as lasers / University of Cambridge Research

Perovskite is the word of the week! This trailblazing new material is being used in cheaper, highly efficient photovoltaics. Commercial silicon-based solar cells (the kind you see on roofs) convert the sun's rays into electrical energy at about 20 percent efficiency -- and it took two decades of research to achieve that rate. Composed of calcium titanate, perovskite is "dirt cheap" compared to silicon in solar cell production, and perovskite-based technology has already reached 17 percent efficiency after just two years of research.

Earlier this week, we learned that -- in addition to absorbing light -- perovskite is also capable of emitting light, suggesting that it can be used in display screens.

Now, University of Cambridge researchers show that perovskite can double up as a laser.

In the 1960s, scientists figured out that if a material is good at converting light to electricity, then it'll be good at converting electricity to light. By sandwiching a thin layer of lead halide perovskite between two mirrors, the team produced an optically driven laser. They also found that the cells show very efficient luminescence: up to 70 percent of absorbed light is re-emitted.

For most commercial solar cell materials, in order to show good luminescence and performance, they first require expensive processing to achieve a low enough level of impurities. These new materials, the authors say, work well even when very simply prepared as thin films using cheap, scalable solution processing. Upon light absorption in perovskite, two charges are formed within 1 picosecond (very, very quickly), but then it takes up to a few microseconds to recombine: that's long enough for chemical defects to stop the light emission in most other semiconductors, including silicon. But perovskite has a much longer carrier lifetime.

Source: http://todayscircuits.blogspot.com/2014/03/tc-solar-cell-material-moonlights-as.html#.VUCEEiGqqko