

University of Toledo researchers break record

Researchers at the University of Toledo searching for more efficient and cleaner forms of energy set a new record for the conversion of sunlight to electricity using the low-bandgap perovskite solar cell.

“Dr. Yan and his team set this record,” wrote Karen Bjorkman, dean of the College of Natural Sciences and Mathematics. “This achievement means they were able to produce a higher amount of electricity than had previously been the case.”

Not only is this solar cell more efficient, but it is also much cheaper with more readily available materials than the silicon-based solar cells, Bjorkman wrote.

The highest record of efficiency was made in Korea at 22.1 percent for the entire perovskite family; the one used by the researchers was one in this family of solar cells, said Yanfa Yan, Ohio research scholar chair and UT professor of physics.

“We focused on the mixed tin-lead perovskite which has less lead than the other perovskites people are working with,” Yan said. “There is a huge effort to replace lead because it is toxic to the environment.”

This tin-lead perovskite can absorb more spectrums of sunlight because it uses two absorbers stacked on each other, according to Yan. He continued that the top cell absorbs a specific array of light and the bottom absorbs a different part of the spectrum.

“This is important because if a solar cell is more efficient, then it can generate even more energy to help power our electricity need...while providing more inexpensive solar energy,” Bjorkman said.

Third-year electrical engineering and computer science and engineering major Tyler Barton said he thinks this research is very important and could lead to a more widespread use of solar panels.

“One of the major setbacks to photovoltaics currently is the large upfront cost of the solar panels themselves, and if this new material could drastically lower the cost, that could push more companies to adopt solar energy,” Barton said.