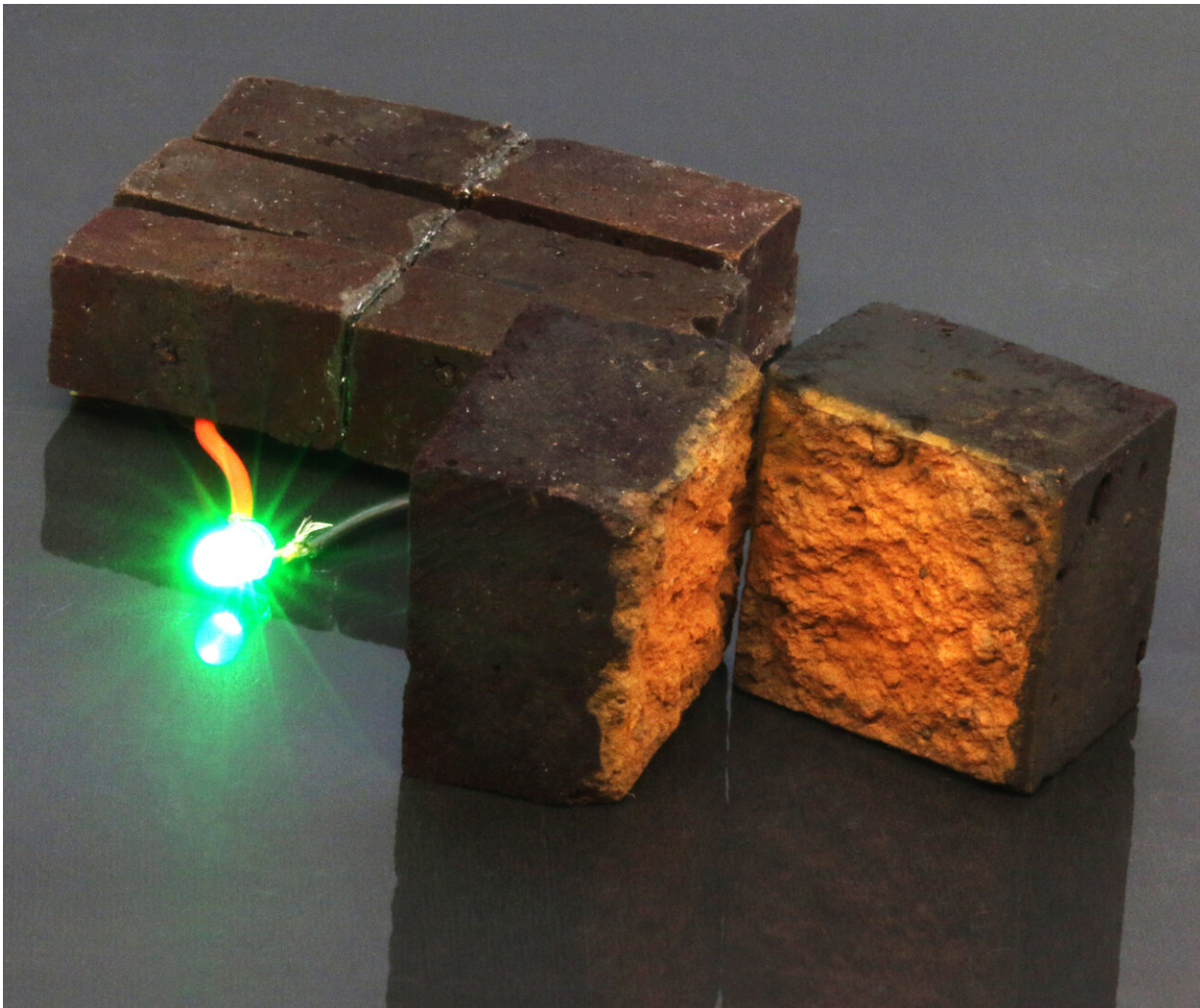


Storing energy in red bricks

August 11 2020, by Talia Ogliore



Red brick device developed by chemists at Washington University in St. Louis lights up a green light-emitting diode. The photo shows the core-shell architecture of a nanofibrillar PEDOT-coated brick electrode. Credit: D'Arcy laboratory, Department of Chemistry, Washington University in St. Louis

Imagine plugging in to your brick house.

Red bricks—some of the world's cheapest and most familiar building materials—can be converted into [energy](#) storage units that can be charged to hold electricity, like a battery, according to new research from Washington University in St. Louis.

Brick has been used in walls and buildings for thousands of years, but rarely has been found fit for any other use. Now, chemists in Arts & Sciences have developed a method to make or modify "smart bricks" that can store energy until required for powering devices. A proof-of-concept published Aug. 11 in *Nature Communications* shows a brick directly powering a green LED light.

"Our method works with regular brick or recycled bricks, and we can make our own bricks as well," said Julio D'Arcy, assistant professor of chemistry. "As a matter of fact, the work that we have published in *Nature Communications* stems from bricks that we bought at Home Depot right here in Brentwood (Missouri); each brick was 65 cents."

Walls and buildings made of bricks already occupy large amounts of space, which could be better utilized if given an additional purpose for electrical storage. While some architects and designers have recognized the humble brick's ability to absorb and store the sun's heat, this is the first time anyone has tried using bricks as anything more than thermal mass for heating and cooling.

D'Arcy and colleagues, including Washington University graduate student Hongmin Wang, first author of the new study, showed how to convert red bricks into a type of energy storage device called a supercapacitor.

"In this work, we have developed a coating of the conducting polymer

PEDOT, which is comprised of nanofibers that penetrate the inner porous network of a brick; a polymer coating remains trapped in a brick and serves as an ion sponge that stores and conducts electricity," D'Arcy said.

The red pigment in bricks—iron oxide, or rust—is essential for triggering the polymerisation reaction. The authors' calculations suggest that walls made of these energy-storing bricks could store a substantial amount of energy.

"PEDOT-coated bricks are ideal building blocks that can provide power to emergency lighting," D'Arcy said. "We envision that this could be a reality when you connect our bricks with solar cells—this could take 50 bricks in close proximity to the load. These 50 bricks would enable powering emergency lighting for five hours.

"Advantageously, a brick wall serving as a supercapacitor can be recharged hundreds of thousands of times within an hour. If you connect a couple of bricks, microelectronics sensors would be easily powered."

The paper, "Energy storing bricks for stationary PEDOT supercapacitors," has been scheduled for publication in *Nature Communications* on 11 August 2020.

More information: Energy storing bricks for stationary PEDOT supercapacitors, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-17708-1](https://doi.org/10.1038/s41467-020-17708-1) , www.nature.com/articles/s41467-020-17708-1

Provided by Washington University in St. Louis

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