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University of Illinois researchers developing coal-based semiconductor

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CHAMPAIGN, Ill. (WCIA) — Most electronic devices like smartphones and laptops are built with semiconductors inside. But U of I is working with material scientists around the world to build them with a more common material that would be able to shrink the semiconductors to allow for smaller devices.

Researchers at the University of Illinois Urbana-Champaign along with the National Energy Technology Laboratory, Oak Ridge National Laboratory and the Taiwan Semiconductor Manufacturing Company are using a new material derived from coal. The material allows for a for an even flatter semiconductor.

materials just a couple of atoms thick,” said Qing Cao, a U of I materials science & engineering professor and a co-lead of the collaboration.

[U of I researchers design material that reacts to temperature](#)

Semiconductors are usually made out of silicon because of the material's low resistance when a current runs through it.

Layers of coal just atoms thick can serve as a great conductor. A benefit to using coal is it's far more available than silicone. The coal layers are also amorphous, meaning they do not have boundaries to leak electrical currents flow to cause additional power consumption.

Future research will focus on methods for scaling up production.

The full paper is published in December 2023's edition of the [Communications Engineering scientific journal](#).

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