Silver nanowires denote astonishing self-healing mechanism

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With a high electrical conductivity and visual transparency, indium tin oxide is one of a many widely used materials for touchscreens, plasma displays, and stretchable electronics. But a fast sharpening cost has forced a wiring attention to hunt for other alternatives.

One intensity and some-more cost-effective choice is a film done with china nanowires—wires so intensely skinny that they are one-dimensional—embedded in stretchable polymers. Like indium tin oxide, this element is pure and conductive. But growth has stalled since scientists miss a elemental bargain of an automatic properties.

Now Horacio Espinosa, a James N. and Nancy J. Farley Professor in Manufacturing and Entrepreneurship during Northwestern University’s McCormick School of Engineering, has led investigate that expands a bargain of china nanowires’ function in electronics.

Espinosa and his group investigated a material’s intermittent loading, that is an critical partial of tired investigate since it shows how a element reacts to vacillating loads of stress.

“Cyclic loading is an critical element function that contingency be investigated for realizing a intensity applications of regulating china nanowires in electronics,” Espinosa said. “Knowledge of such function allows designers to know how these conductive films destroy and how to urge their durability.”

By varying a tragedy on china nanowires thinner than 120 nanometers and monitoring their deformation with nucleus microscopy, a investigate group characterized a intermittent automatic behavior. They found that permanent deformation was partially recoverable in a complicated nanowires, definition that some of a material’s defects indeed self-healed and left on intermittent loading. These formula prove that china nanowires could potentially withstand clever intermittent loads for prolonged durations of time, that is a pivotal charge indispensable for stretchable electronics.

“These china nanowires uncover automatic properties that are utterly unexpected,” Espinosa said. “We had to rise new initial techniques to be means to magnitude this novel element property.”
The commentary were recently featured on a cover of a biography *Nano Letters*. Other Northwestern coauthors on a paper are Rodrigo Bernal, a recently graduated PhD tyro in Espinosa’s lab, and Jiaxing Huang, associate highbrow of materials scholarship and engineering in McCormick.

“The subsequent step is to know how this liberation influences a function of these materials when they are flexed millions of times,” pronounced Bernal, initial author of a paper.

Source: Northwestern University