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# Stretchable LEDs could mean better medical implants

## New way developed to make thin, flexible light-emitting diodes



By Michelle Bryner



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A new way to make thin, flexible sheets of light-emitting electronics could lead to better medical implants, wearable light sources and high-tech surgical gloves.

By modifying processes used to make computer chips, researchers were able to create mesh-like sheets of miniaturized light-emitting diodes, or LEDs, and put them on any kind of substrate, ranging from aluminum foil and paper to rubber balloons and even leaves.

The research team has made a range of materials and devices using this method, including diagnostic tattoos implanted under the skin, light-emitting surgical gloves and sutures, and “smart” drug-delivery systems. They are also working with mc10, a start-up

to commercialize some of these stretchy LEDs.

### Stamp pad process

Currently, LEDs, which become illuminated when electrons move through a semiconductor, are made using a process that involves growing the electronics on a rigid semiconductor wafer and then slicing them into small pieces.

This process makes “big, chunky devices ... in forms that make it impossible to do this kind of mesh-like construction,” said lead study researcher John Rogers, a professor of materials science and engineering at the University of Illinois, Urbana-Champaign.

To make stretchy LEDs, the researchers

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a soft, rubber stamp picks up “ink” made up of tiny LEDs and prints it down on a material such as a sheet of aluminum foil. The LEDs are 10 times thinner than a strand of hair.

### 'Smart' sensing

The researchers have also used this new method to make light sensors called photodetectors, which can measure light reflected off of another object. Combining these tiny light sensors and LEDs could be useful for [robotics](#), Rogers said.

One example of how this could be used is to help iRobot's autonomous vacuum avoid crashing into furniture, Rogers told TechNewsDaily.

“If you can make an optical-based [proximity sensor](#) that kind of wraps onto the curvilinear surface of the device then that sensor can tell the robot how far it is away from a solid object for collision avoidance,” Rogers said.

Current LEDs are rigid, making it impossible to mold them to a robot or other curved surfaces, he added.

Rogers and his team detail their development [online](#) Oct. 17 in Nature Materials.

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