

Engineers create polymer light-emitting devices that can be stretched like rubber

August 5 2011, By Wileen Wong Kromhout

Stretchable electronics, an emerging class of modern electronic materials that can bend and stretch, have the potential to be used in a wide range of applications, including wearable electronics, "smart skins" and minimally invasive biomedical devices that can move with the body.

Today's conventional inorganic electronic devices are brittle, and while they have a certain flexibility achieved using ultrathin layers of [inorganic materials](#), these devices are either flexible, meaning they can be bent, or they are stretchable, containing a discrete LED chip interconnected with stretchable electrodes. But they lack "intrinsic stretchability," in which every part of the device is stretchable.

Now, researchers at the UCLA Henry Samueli School of Engineering and Applied Science have demonstrated for the first time an intrinsically stretchable polymer light-emitting device. They developed a simple process to fabricate the transparent devices using single-walled [carbon nanotube](#) polymer composite electrodes. The interpenetrating networks of [nanotubes](#) and the polymer matrix in the surface layer of the composites lead to low sheet resistance, high transparency, high compliance and low surface roughness.

The metal-free devices can be linearly stretched up to 45 percent and the composite electrodes can be reversibly stretched by up to 50 percent with little change in sheet resistance.

Because the devices are fabricated by roll lamination of two composite

electrodes that sandwich an emissive polymer layer, they uniquely combine mechanical robustness and the ability for large-strain deformation, due to the shape-memory property of the composite electrodes. This development will provide a new direction for the field of stretchable electronics.

This research was recently published in the peer-reviewed journal *Advanced Materials* .

More information: [DOI: 10.1002/adma.201101986](https://doi.org/10.1002/adma.201101986)

Provided by University of California Los Angeles

Citation: Engineers create polymer light-emitting devices that can be stretched like rubber (2011, August 5) retrieved 20 April 2024 from <https://phys.org/news/2011-08-polymer-light-emitting-devices-rubber.html>

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