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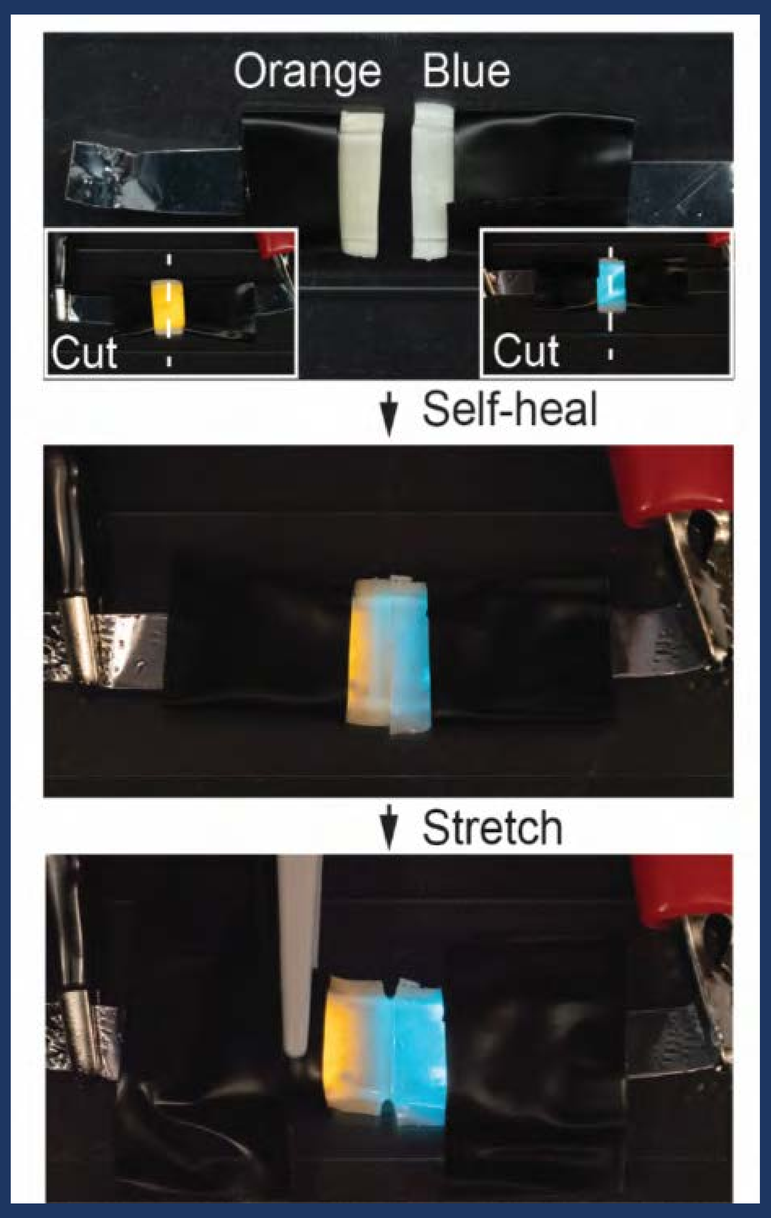
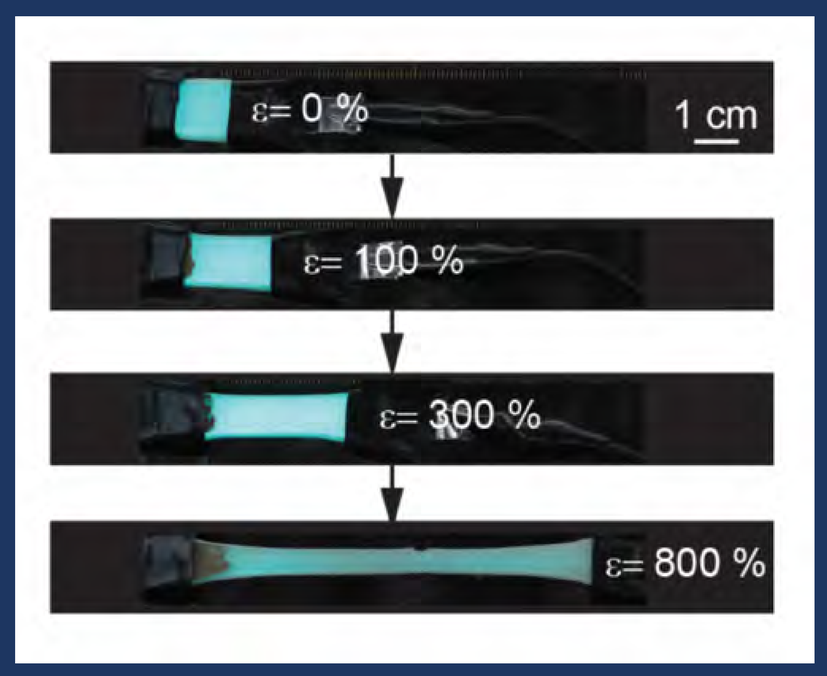
Self Healing Resilient Light Emitting Dielectric

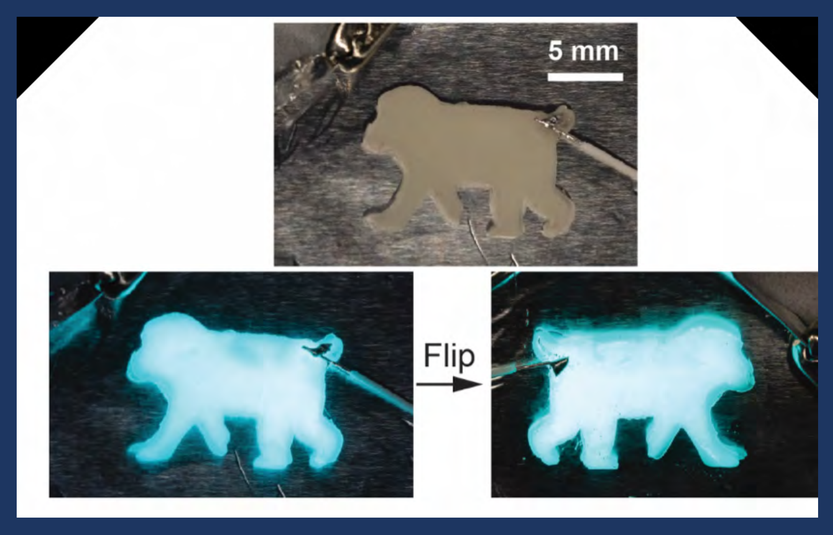
The rapid development of electronic-skins, wearable electronics, and soft robots has spurred widespread research interest in the development of stretchable, flexible, and conformable dielectric materials.

However, there are a number of challenges for implementation of such devices, for example intrinsically stretchable displays usually require high operating voltages in the range of 100 V – 1 kV, and often operate at high switching frequencies. These high electronic operating requirements make it potentially challenging for usage in devices that may require human-machine interactions such as electronic skins and displays. Moreover, permanent mechanical and electrical damage limit their operating lifetimes

Hence, fully self-healable stretchable dielectric materials that enable operation at reasonably low voltages is of great interest in many emerging applications. NUS' electroluminescent (EL) technology has the lowest threshold voltage and operational frequency among all the reported stretchable EL devices. Furthermore, NUS' self-healing dielectric material is stretchable by 800%. Electroluminescence can be effected as low as 6V and is continuing being lowered with each technology improvement iteration. Such repeatably self-healing EL devices can allow new potential uses in artificial electronic skins and stretchable, conformable displays that are robust to mechanical damage.







This technology enables conformable and mechanically robust luminescent dielectric material that is low cost and capable of mass production using today's manufacturing techniques.

NUS' dielectric material is a platform technology which can act as a base of stretchable matrix to which other devices are fabricated upon. Stretchable luminescence devices can further enable exciting applications in wearable electronics displays, human-machine interfaces, emerging soft robotics and a torrid of applications limited only by imagination.

Some potential applications:

- Stretchable displays that can be viewed from all directions
- Woven into fabric to create luminescent clothing
- Safety and first aid equipment that will benefit from stretchable luminescent technology, e.g. vests and gloves
- Provide clear visual guidance in critical environment such as marine and offshore systems
- Artificial skin for robotics that emits light and response to the environment based on light sensing
- Immediate self healing ability allows this soft flexible luminescent layer to act as protective barrier for phones, vehicle bumpers or any other valuable devices

For more information on the technology, contact:

NUS Industry Liaison Office
HJ Chen
ilochj@nus.edu.sg

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