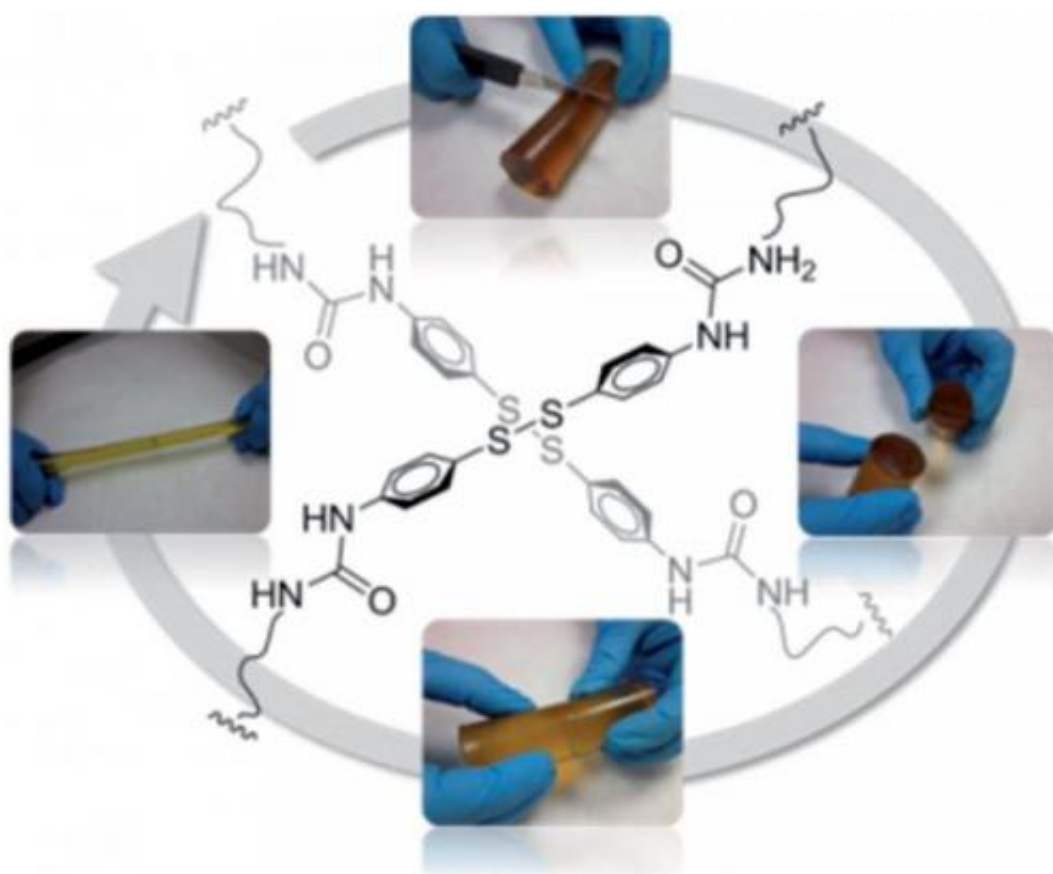


First reported self-healing polymer that spontaneously and independently repairs itself

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A cylindrical sample of the elastomer mends itself after being cut in two by a razor blade and can be manually stretched without rupture.

Scientists in Spain have reported the first self-healing polymer that

spontaneously and independently repairs itself without any intervention. The new material could be used to improve the security and lifetime of plastic parts in everyday products such as electrical components, cars and even houses.

The researchers have dubbed the material a 'Terminator' polymer in tribute to the shape-shifting, molten T-100 terminator robot from the Terminator 2 film.

The research is published in the Royal Society of Chemistry journal *Materials Horizons*.

Self-healing polymers that can spontaneously achieve quantitative healing in the absence of a catalyst have never been reported, until now. The scientists prepared the self-healing thermoset [elastomers](#) from common polymeric starting materials using a simple and inexpensive approach.

A video shows that the permanently cross-linked poly(urea-urethane) elastomeric network completely mends itself after being cut in two with a razor blade. A metathesis reaction of aromatic disulphides, which naturally exchange at room temperature, causes the regeneration.

The polymer behaves as a Velcro-like sealant or adhesive, displaying an impressive 97 per cent healing efficiency in just two hours. The researchers show that after cutting the material into two separate pieces with a razor blade and allowing it to self-heal, the material is unbreakable when stretched manually.

The authors said: "The fact that poly(urea-urethane)s with similar [chemical composition](#) and mechanical properties are already used in a wide range of commercial products makes this system very attractive for a fast and easy implementation in real industrial applications."

More information: [pubs.rsc.org/en/content/article...
g/2013/mh/c3mh00061c](https://pubs.rsc.org/en/content/articlelanding/2013/mh/c3mh00061c)

Provided by Royal Society of Chemistry

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