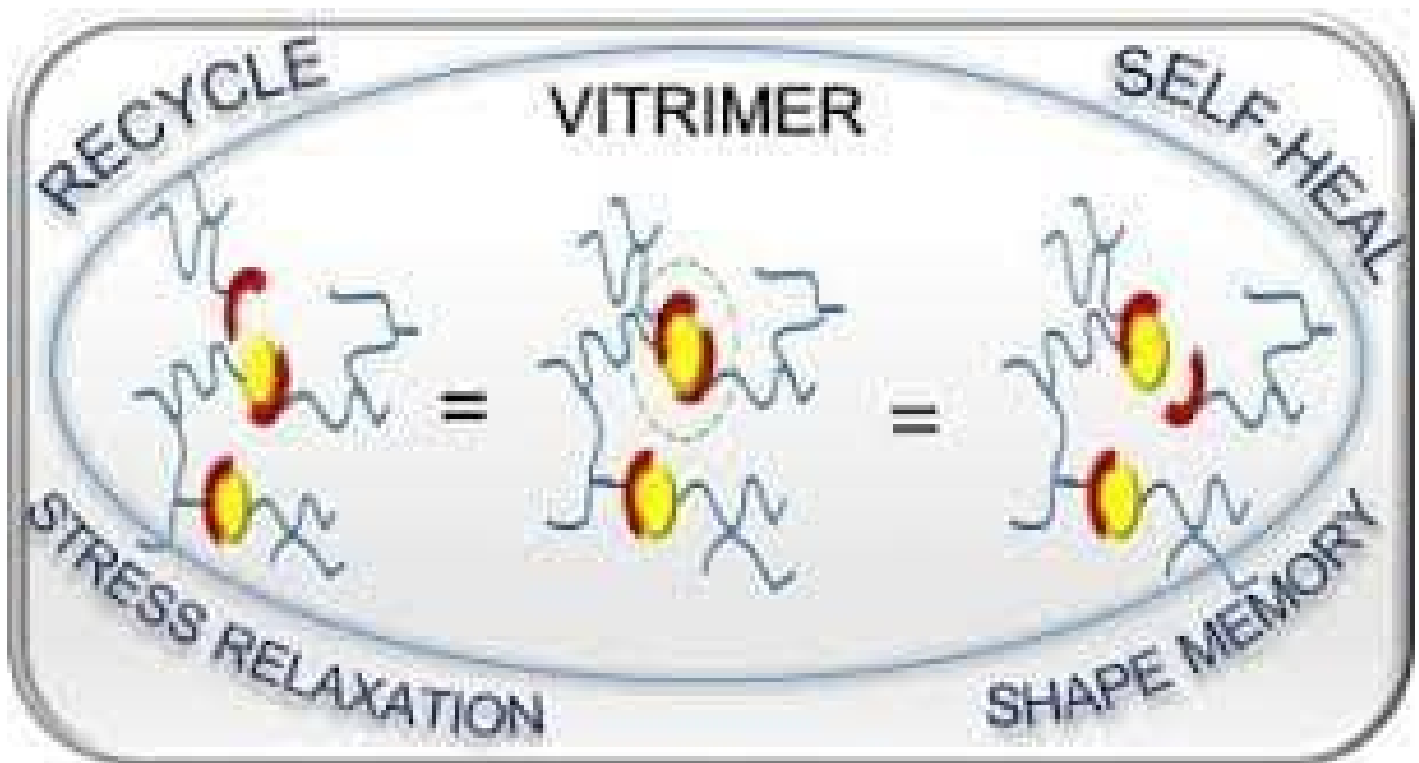


What is Vitrimer?

November 5, 2023 • vajiramandravi.com



About Vitrimer

- These represent a relatively recent category of plastics known for their impressive strength at low temperatures.
- They also possess the unique ability to be reshaped numerous times when exposed to higher temperatures.
- It is also partially biodegradable.
- Nonetheless, they do have a notable drawback – extreme brittleness, as they cannot be stretched far before breaking.
- To address this issue, researchers introduced a molecule called polyrotaxane into the plastic synthesis process, resulting in a novel plastic variant they’ve dubbed VPR, an abbreviation for “vitrimer incorporated with polyrotaxane.”
- VPR is over five times as resistant to breaking as a typical epoxy resin vitrimer.
- At a high temperature of around 150 degrees Celsius, VPR start to recombine, allowing the material to take on different forms.
- It also repairs itself 15 times as fast, can recover its original memorised shape twice as fast and can be chemically recycled 10 times as fast as the typical vitrimer.
- It even biodegrades safely in a marine environment, which is new for this material.

Q1) What is polyrotaxane?

A polyrotaxane is a type of mechanically interlocked molecule or supramolecular structure. It consists of one or more linear polymer chains threaded through a ring-shaped molecule. This arrangement resembles a threaded nut on a bolt, where the linear polymer chain represents the bolt, and the ring-shaped molecule represents the nut.

Source: [Japan: Scientists develop self-healing, stronger and partially biodegradable plastic](#)

Source: <https://vajiramandravi.com/current-affairs/vitrimer/>

© Vajiram & Ravi. For personal use only.