Researchers accidentally discover that mixing water with a peptide results in self-assembling and self-healing glass

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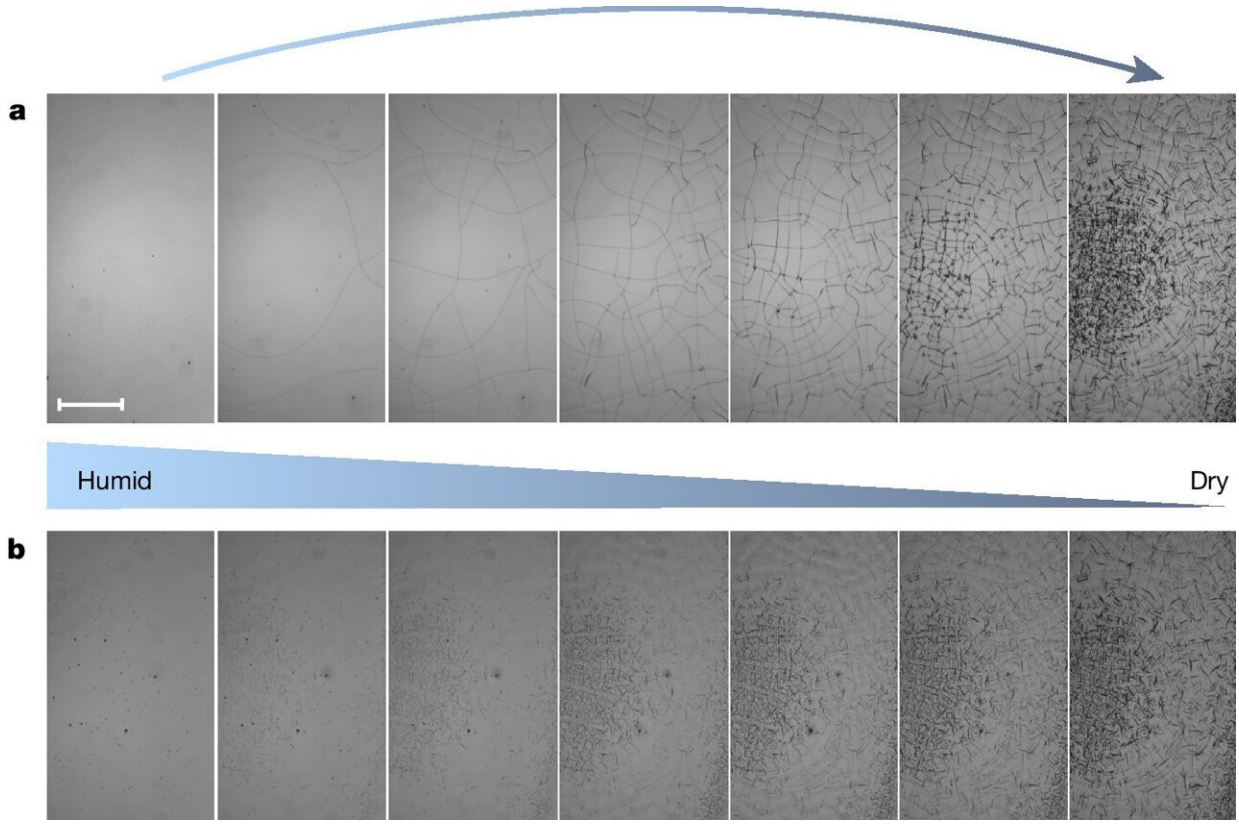

Cracking and self-healing of the peptide glass. Credit: *Nature* (2024). DOI: 10.1038/s41586-024-07408-x

A team of materials scientists from Tel Aviv University and Ben-Gurion

University of the Negev, both in Israel, working with a colleague from California Institute of Technology, in the U.S., has found that mixing a certain peptide with water results in the creation of a self-assembling and self-healing glass.

While investigating the properties of other proteins, the group stumbled upon the discovery, which has been published in *Nature Communications*. Silvia Marchesan, with the University of Trieste, in Italy, has published a News and Views piece in the same journal issue, outlining the newly found glass and possible uses for it.

In this new effort, the research team was investigating the possibility of using short peptides as stand-ins for conventional components of complex macro-molecules. As part of that effort, they worked with a dipeptide molecule that consisted of two phenylalanine residues when they discovered that mixing it with nothing but water led to the creation of a self-assembling type of supramolecular amorphous glass as the water evaporated at room temperature.

What was most surprising about the discovery was that peptide self-assembly in the past has typically led to the creation of materials with a crystalline structure, something that would not be transparent and thus not even close to glass.

Upon discovering the new type of glass, the researchers began investigating its properties. They found that in addition to automatically building itself, the glass was both self-healing and adhesive, despite being highly rigid.

It was also deemed to be extremely strong. The researchers found that it was as transparent as traditional glass, and further investigation showed that the glass could be used to make glass panes and coatings to create hydrophilic surfaces. They also found it could be used to make things

that require precision, such as optical lenses that could be used for a wide range of magnification purposes.

The research team suggests that additional testing could lead to a wide variety of uses for the glass, noting that the new type of glass does not require a lot of energy to produce as is typical with most glasses now in commercial use.

More information: Gal Finkelstein-Zuta et al, A self-healing multispectral transparent adhesive peptide glass, *Nature* (2024). DOI: 10.1038/s41586-024-07408-x

Silvia Marchesan, Self-healing glass from a simple peptide — just add water, *Nature* (2024). DOI: 10.1038/d41586-024-01505-7

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