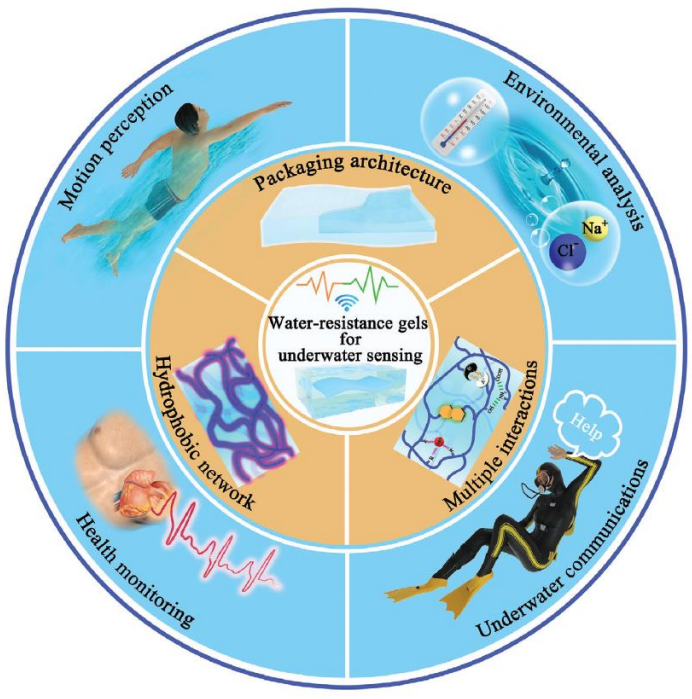
Physically Crosslinked Amphiphilic Eutectogels with Underwater Self-Healing, Strong Adhesion, and Closed-Loop Recyclability

Zeyu Zhang, Patrizio Raffa
E-mail: p.raffa@rug.nl
Department of Chemical Engineering, University of Groningen, 9747 AG Groningen, The Netherlands

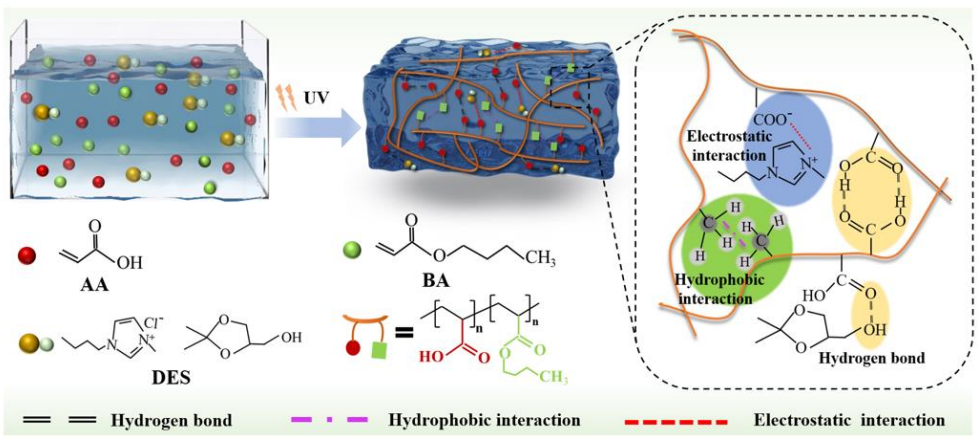
Introduction

- Eutectogels are emerging as soft material with great promise for application in soft electronics.

- Hydrophobic association, hydrogen bonding and electrotactic interaction



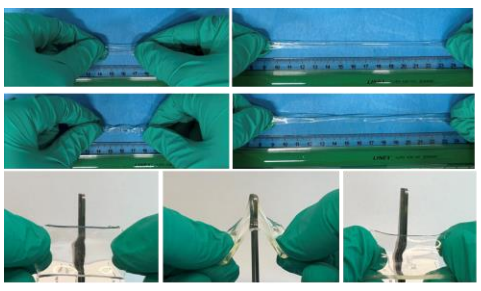
Strategy

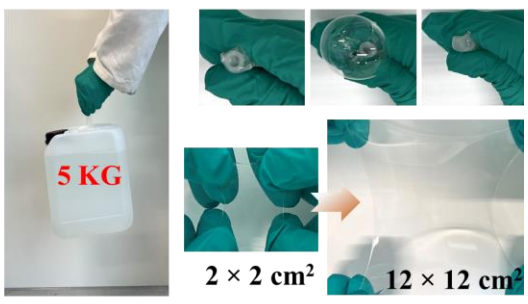


The physically crosslinked conductive eutectogel.

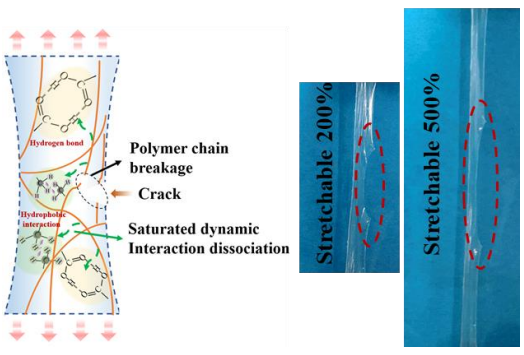
Results

- The gel possesses outstanding mechanical performance

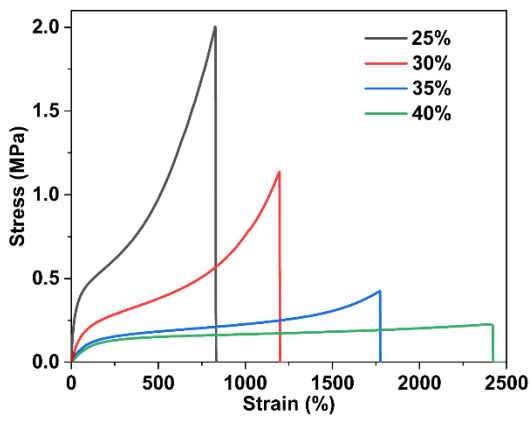




Toughness of the eutectogel

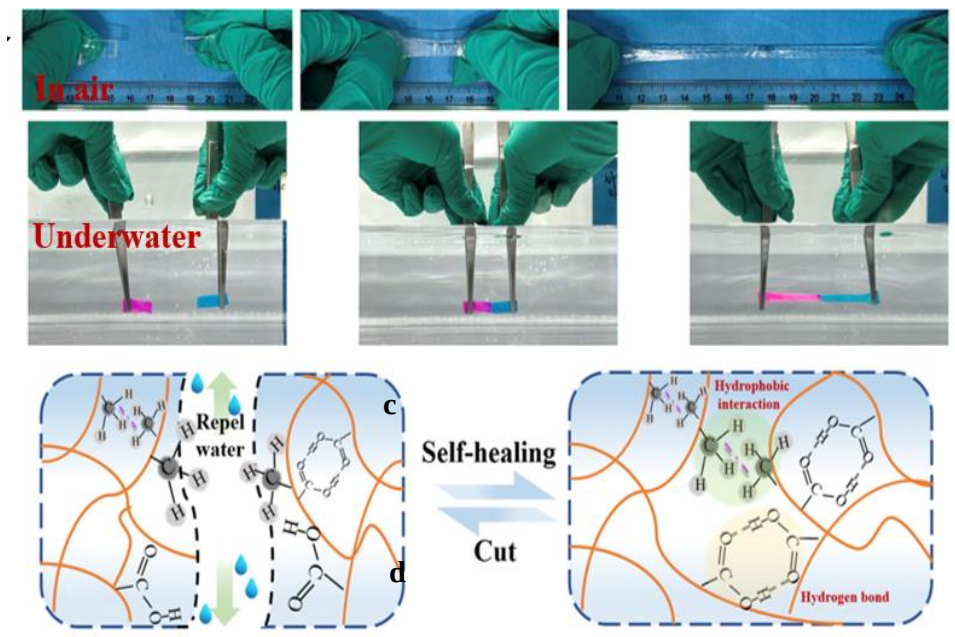


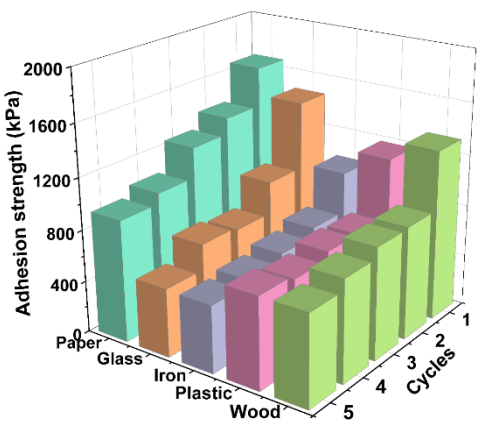
Gel's network structure



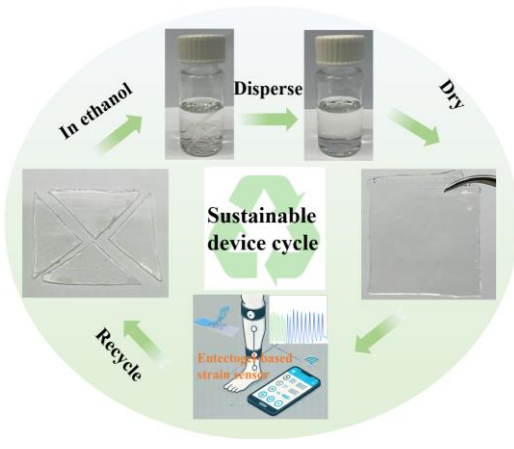
High stretchability

- The eutectogels show excellent underwater self-healing and adhesion properties.





Adhesive strength



Recyclability of eutectogel

Conclusions

- The abundant noncovalent interactions and copolymerization of hydrophobic and hydrophilic monomers endowed the gels with robust mechanical performance, underwater self-healing capability and strong adhesion.

- Due to the abundance of reversible non-covalent interactions within the gel network, the eutectogel could be recycled.

References

1. Acs Nano 2024, 18 (29), 18980-18991.

2. Adv. Mater. 2021, 33 (51), 2105306.

- The first author of this work is financially supported by the China Scholarship Council (CSC) under Grant Number 202006100036