Docket #: S22-180

Dynamic Recombinant Hydrogels with Degradation-Independent Relaxation Kinetics

Researchers at Stanford have invented a novel hydrogel with enhanced retention and extended durability. This hydrogel can be held together three times longer than many alternatives without sacrificing its self-healing attributes during injection. Hydrogels are used for a range of research and clinical applications due to their ability to mimic physical properties of human tissues. Common uses include vitro human development modeling, in-vivo drug delivery, and cell culturing. While a key feature of protein-engineered hydrogels is their ability to be tuned to desired stiffnesses, such tailoring contributes to rapid erosion rates, often degrading within a day. In this technology, static covalent bonds are leveraged to create "spot welds" that drastically slow down its erosion without affecting the overall stiffness or inhibiting the shear-thinning behavior of gels. The use of these improvements have demonstrated that the resulting gels can be held together for 7+ days (compared to 2 days for hydrogels with other bonding molecules).

Applications

- Cell culture
- Cellular therapeutics
- In vitro models
- In vivo drug delivery

Advantages

- **Tunable** mechanical properties
- **More robust** – No shear-thinning

- **Longer lasting** – 7+ days compared to 2 days for existing alternatives

Patents

- Published Application: 20240150499

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