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REVERSIBLE CROSS-LINKED POLYMERS FOR DRUG DELIVERY

THERAPEUTICS

In situ gelling hydrogels formed from self-healing, reversible, cross-linked polymers mixed at body temperature for drug delivery and injection.

TECHNOLOGY TYPE

Drug Delivery

STAGE OF DEVELOPMENT

Proof of concept demonstrated through testing of the hydrogel.

IP PROTECTION

Continuation Issued

Polymeric Compositions and Methods of Making and Using Thereof
US8747870B2

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TECHNOLOGY SUMMARY

Controlled-release drug delivery systems often use hydrogels as drug carriers due to their adjustable swelling capacities. Hydrogel fabrication, however, typically requires cytotoxic materials or conditions that limit their use in biological systems. Additionally, synthetic hydrogels fail in high stress application because they are unable to self-heal.

The proposed invention enables creation of self-healing, reversible, cross-linked polymers. The hydrogels are fabricated by mixing two liquid-state pre-polymer under physiologic conditions to form a gel at body temperature. In acidic conditions, the hydrogel becomes a viscous, free-flowing gel, but can return to its original form when pH is adjusted. These cross-linked hydrogels also exhibit shear thinning and viscoelastic recovery properties. The novel hydrogel has potential applications in vaginal drug delivery, tissue engineering, lysosomal drug delivery, gastric drug delivery, cell culture, and food gelation.

FEATURES AND BENEFITS

- Exhibits stability under most pH conditions.
- Has bio-adhesive, shear thinning, and viscoelastic properties.
- Reduces cytotoxicity.
- Facilitates rapid gelation of hydrogels in situ.
- Enables use in high stress applications.

INVENTORS

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