

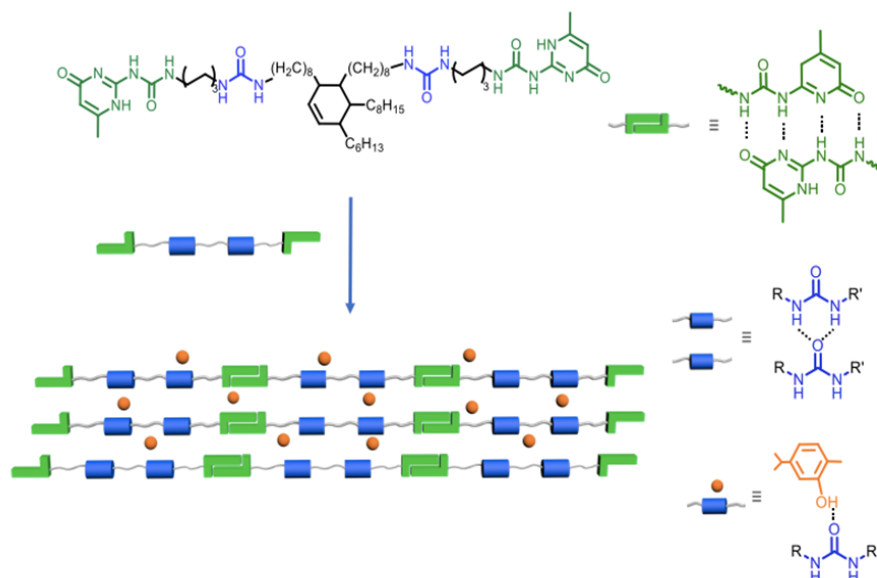
Supramolecular Polymer Composition and Method of Preparation



Health & Wellness

Biomedical and Genetic Engineering

Nanotechnology and New Materials



Scheme 1 Supramolecular organogels structure with long polymer chains and large-scale crosslinked network. Essential oil molecules tend to interact with carbonyl units by destroying weak hydrogen bond between urea-urea groups.

Opportunity

Contemporary antibacterial technology faces a variety of limitations including low strength, significant biological toxicity, inevitable bacterial resistance, and high product prices. In contrast to currently available technologies, this invention is a supramolecular organogel (that is, a soft material that is made out of organic liquids and low-molecular-mass organic gelators). This organogel is characterized by its good transparency, its strength, its ability to promote rapid healing, and its long-lasting antimicrobial properties. Moreover, as an essential oil is encapsulated within the organogel, the organogel exhibits significant controlled-release properties, allowing it to maintain longer-lasting antimicrobial activity. In addition, unlike antimicrobials that use inorganic nanoparticles, the essential oil does not harm the environment or the human body. Crucially, this organogel can also be produced using simple fabrication methods and processes, allowing it to find a wide variety of potential applications.

Technology

IP Status

Patent filed



Technology Readiness Level (TRL) ?

4

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Follow-on Funding

Develop Concept

Proof Concept

Build Value

This invention involves a novel approach to preparing supramolecular organogels. It utilizes substances containing hydrogen bonding units and essential oils to prepare supramolecular organogels. The hydrogen bonding units grant the organogel greater strength and significant healing properties. The method of preparation also allows for the organogel to exhibit a robust coating (that is, the surface of the organogel) and a free-standing film, while the strength and healing properties of the organogels can be easily controlled by tailoring the mass ratio of manufactured material to essential oil. The essential oils that are encapsulated in the organogels can also contribute to a long-term antimicrobial effect.

Advantages

- The organogels manufactured in this process are strong and exhibit rapid healing properties.
- The essential oils encapsulated in the gels exhibit significant controlled-release properties.
- The essential oils are environmentally friendly and also friendly to the human body.
- The organogels outlined in this invention are compatible with current manufacturing processes.

Applications

- Bactericidal coatings
- Films for wound dressing
- Superstrong adhesives

