

"Healing from Within: Self-Healing Composites Revolutionize Dentistry"

Self healing composite

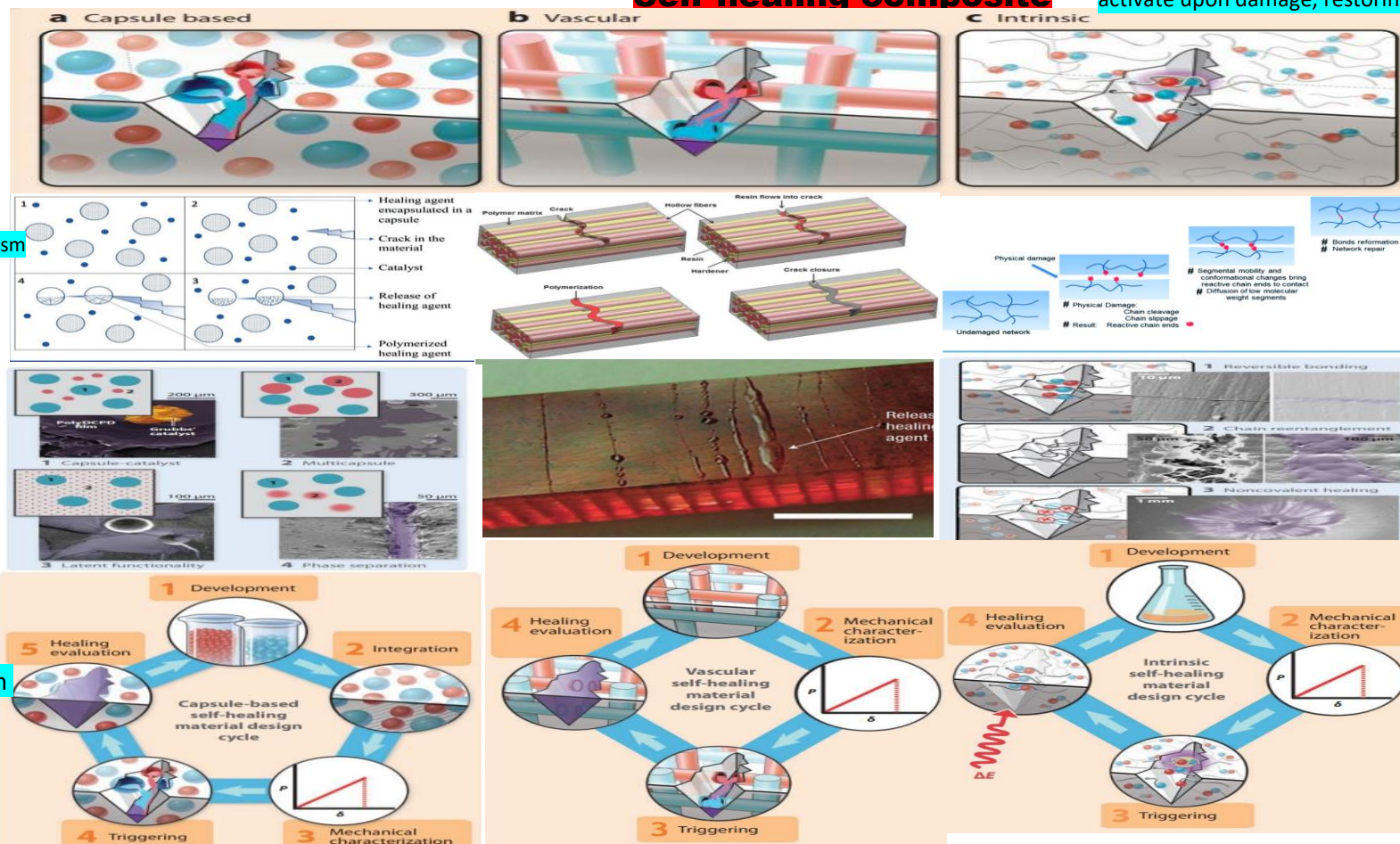
Introduction: Self-healing composites are advanced materials designed to automatically repair damage, such as cracks or fractures, without human intervention. These materials integrate healing agents or mechanisms that activate upon damage, restoring their structural integrity and extending their lifespan.

types

mechanism

Main
schemes
of
healing

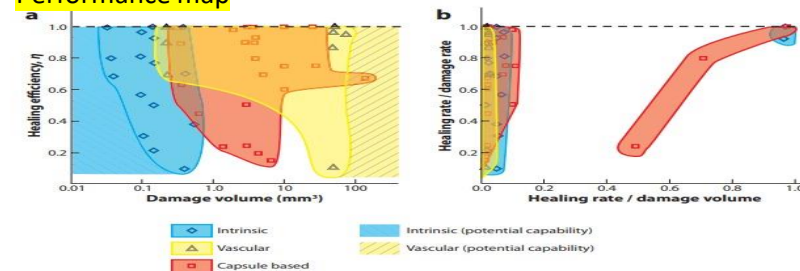
Design
cycle



self healing material system

- **Healing Agent:** Dicyclopentadiene (DCPD)
- **Microcapsule shell:** Urea-formaldehyde (UF) (mean 166µm diameter)
- **Chemical Catalyst:** Bis(tricyclohexylphosphine) benzylidene ruthenium (IV)
- **Flexibilizer:** Heloxy 71, Shell Chemical Company used to improve toughness and crack growth stability
- **Polymer Matrix:** Epoxy Polymer Matrix EPON 828

Performance map



NEED OF SELF HEALING MATERIALS

- Built in capability to substantially recover their load transferring ability after damage.
- Contribute greatly to the safety and durability of polymeric components. Capable of continuously sensing and responding to damage over the lifetime. Restoring the material performance.
- Offers great opportunities for broadening the applications.
- Refer to the recovery of properties such as fracture toughness, tensile strength.

Conclusion: Microcapsule-based self-healing polymer materials show great potential for use in dental applications, particularly in enhancing the durability and performance of dental resins, adhesives, and composite materials. With continued advancements, these materials are expected to provide longer-lasting, more effective solutions for dental restorations in the future.