Next-Generation Infection Control: Antibiotic-Free, and Non-Invasive Stimuli-Responsive Solutions Against Drug-Resistant Bacteria

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Technology

Current antibacterial therapies struggle to eliminate drug-resistant biofilms without harming healthy tissue, while systemic antibiotics accelerate resistance. Our platform overcomes this by integrating non-invasive stimuli (near-infrared light, ultrasound, microwave) with responsive nanomaterials and implant surfaces. These engineered systems generate localized heat, reactive oxygen species, or mechanical disruption upon external activation, achieving >99% biofilm eradication while preserving host cells. Unlike antibiotics, our approach prevents resistance by targeting physical biofilm structures and bypassing bacterial metabolic pathways. This precision enables on-demand, repeatable treatment for chronic infections and implant-related risks, offering a sustainable alternative to conventional antimicrobial strategies

Stage of Development

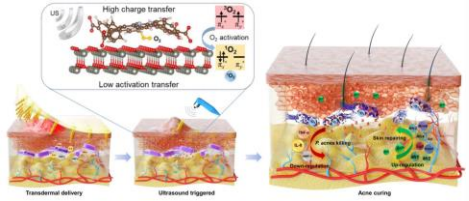
- Stimuli-responsive platform: Lab-validated, advancing to industrial-scale process optimization.
- *In vivo* efficacy: Demonstrated >90% biofilm eradication in animal models

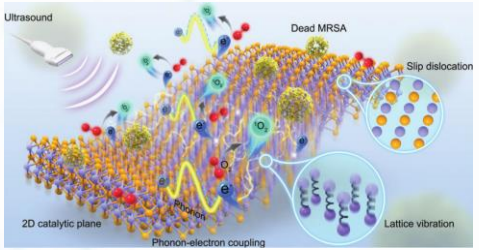
Key Advantages

- Non-Antibiotic Eradication – Eliminates bacteria and biofilms (>99%) via non-invasive stimulus, bypassing drug resistance entirely.
- Biofilm-Responsive Precision – Targets infections on demand with localized heat/ROS generation, sparing healthy tissue and enabling repeatable treatment.
- Universal Medical Compatibility – Adapts to implants, chronic wounds, or deep tissues, offering a platform solution for diverse clinical scenarios.

Opportunities

- New standard against drug-resistant infections
- First on-demand therapy for deep-tissue infections – Enabling rapid eradication of biofilms
- Cross-disciplinary adaptable platform





Intellectual Property

CN Patent no.: CN 102341132
US Patent no.: US 20110046747
EP Patent no.: EP 2398517

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