Self-healable Vibration-Damping and Impact-Resistant Material for Noise-Canceling Devices

Polymeric elastomers are revolutionizing industries by providing exceptional flexibility, impact resistance, and energy dissipation. Designed with specialized polymers, these materials efficiently absorb and dissipate energy under dynamic stress. Inspired by resilient biological systems, they are engineered to maintain strength, flexibility, and self-healing after damage. These unique properties make them ideal for sectors such as defence, automotive, aerospace, construction, and electronics. The development of high-performance elastomers is key to improving product durability under extreme conditions. These materials offer impact resistance, energy absorption, and self-healing, making them suitable for shock-absorbing packaging, protective coatings, and energy storage. Their ability to repair autonomously ensures long-term functionality and reduced maintenance costs, positioning them as an eco-friendly alternative to conventional materials. A research team at the Department of Chemistry, IIT Bhilai, comprising Swarup Maity, Nishikanta Singh, and Dr. Sanjib Banerjee, has developed smart materials for unbreakable and soundproofing devices. These materials are synthesized using a simple, cost-effective, and industry-friendly process. The innovative material demonstrates exceptional impact resistance, energy dissipation, and self-healing properties, making it suitable for a wide range of applications, including but not limited to its use in the construction of unbreakable and soundproofing devices. This work has been published in *Chemical Engineering Journal*, a leading journal in the field. The research is supported by SERB, Govt. of India and IIT Bhilai.

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