

Hybrid Materials for Piezoelectric Energy Harvesting and Conversion

Collagen-Based Hybrid Piezoelectric Material

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Abstract

Piezoelectricity, a bidirectional electromechanical coupling, has an extensive range of functions, such as energy harvesters, biomedical devices, sensors, cars, etc. A considerable amount of research has been conducted to investigate this phenomenon's energy harvesting potential. Traditional piezoelectric inorganics have high piezoelectric outputs but are frequently brittle and inflexible and may contain dangerous substances such as mercury or other heavy metals which are toxic to humans as well as other animals. Biological piezoelectric materials, on the other hand, are biodegradable, biocompatible, bioabsorbable, sustainable, non-cytotoxic, as well as facile to fabricate. As a result, they are valuable for a large number of applications, including tissue engineering, biological research, and energy harvesting. The rationale of this chapter is to describe the basis of piezoelectricity in collagen-based biological as well as non-biological hybrid materials, as well as the research involved in those materials as per literature, along with their uses and limitations.