Patent Search

Invention Title	UNIQUE MAGNETIC NATURAL FIBER COMPOSITES FOR ENERGY HARVESTING APPLICATIONS
Publication Number	20/2024
Publication Date	17/05/2024
Publication Type	INA
Application Number	202441035598
Application Filing Date	04/05/2024
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	ELECTRICAL
Classification (IPC)	H02N0002180000, H01L0041113000, H01L0041180000, G01M0005000000, H01L0041193000

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Abstract:

The present invention discloses a novel composite material composed of natural fibers embedded with magnetic nanoparticles for energy harvesting applications. Th material combines the inherent piezoelectric properties of natural fibers with the magnetic properties of nanoparticles to efficiently convert mechanical energy from sources, such as vibrations, movements, and mechanical stress, into electrical energy. The incorporation of magnetic nanoparticles enhances the piezoelectric effect i fibers, resulting in improved energy conversion efficiency. The composite material can be tailored for specific applications in fields such as wearable electronics, struc monitoring, and renewable energy generation, offering a sustainable and versatile solution for self-powered systems. Accompanied Drawing [FIGS. 1-2]

Complete Specification

Description:[001] The present invention pertains to the field of materials science and energy harvesting technologies. Specifically, it relates to the development of c materials for efficient conversion of mechanical energy into electrical energy. The invention focuses on utilizing natural fibers embedded with magnetic nanoparticl enhance the piezoelectric properties of the material, thereby enabling improved energy harvesting capabilities. This innovation finds application in various fields su wearable electronics, structural health monitoring, and renewable energy generation, where self-powered systems are desirable.

[002] Natural fibers, including but not limited to cotton, bamboo, and hemp, have garnered significant interest in recent years due to their abundance, flexibility, an biodegradability. These fibers possess inherent piezoelectric properties, making them suitable candidates for energy harvesting applications. However, the piezoele response of natural fibers is typically limited, necessitating the development of methods to enhance their performance.

[003] Simultaneously, magnetic nanoparticles have emerged as promising additives for enhancing the properties of composite materials. By incorporating magnetic nanoparticles into a matrix material, various functionalities such as magnetostriction, magnetic alignment, and improved mechanical properties can be achieved. Th invention leverages the synergistic effects of natural fibers and magnetic nanoparticles to enhance the energy harvesting efficiency of the composite material.

[004] The composite material developed in this invention offers several advantages over conventional energy harvesting materials. Firstly, it exhibits enhanced ener conversion efficiency due to the improved piezoelectric response facilitated by the magnetic nanoparticles. Secondly, the use of natural fibers renders the material biodegradable and environmentally friendly, addressing concerns regarding sustainability. Additionally, the versatility of the composite material allows for customiz according to specific application requirements by adjusting the type and concentration of natural fibers and magnetic nanoparticles.

[005] In summary, the present invention represents a significant advancement in the field of energy harvesting by introducing a novel composite material that comb

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