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CeNS develops flexible piezoelectric nanocomposites for biomedical and wearable sensors

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It can be incorporated into wearable health monitoring systems



An innovative piezoelectric device has been fabricated using a polymer nanocomposite of flower-shaped tungsten trioxide (WOâ??) nanomaterial embedded in a polyvinylidene fluoride (PVDF) matrix, paving a viable path towards flexible, wearable, highly efficient, energy-harvesting, pressure-sensing devices.

Researchers at the Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, an autonomous institute of the Department of Science and Technology (DST) employed a systematic experimental approach to explore the interactions between polymers and nanomaterials.

The research which involves mixing of flexible piezoelectric polymer and nanoparticles and systematic study of the resultant mechanical energy conversion efficiency gives an insight into understanding/classifying what type of nanoparticle can enhance the piezoelectric properties of a piezoelectric polymer.

The high sensitivity and energy efficiency of this nano-engineered system make it ideal for biomedical uses. In particular, it can be incorporated into wearable health monitoring systems that can capture biomechanical energy from minor to major body movements like heartbeats, pulses, breathing, walking, etc., and transform it into electrical signals. By using these signals, physiological parameters can be monitored in real time without requiring external power sources.