Ultraflexible Organic Photovoltaics and Energy Harvesting-Storage System for Wearable Applications

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Abstract:

The rapid advancement of wearable technology has accentuated the need for flexible power systems. These systems are expected to exhibit high efficiency, robust durability, consistent power output, and the potential for effortless integration. However, the challenge of integrating ultraflexible energy harvesters with energy storage devices to create an autonomous, efficient, and mechanically compliant power system remains significant. In this talk, we present strategies for developing high-performance organic photovoltaics that possess extreme mechanical compliance and operational stability, facilitating easy integration with textiles and the human body [1,2]. We then introduce a 90 μm-thick energy harvesting and storage system (FEHSS) that comprises organic photovoltaics and zinc-ion batteries within an ultraflexible configuration. With a power conversion efficiency surpassing 16%, power output exceeding 10 mW cm^{-2}, and an energy density greater than 5.82 mWh cm^{-2}, the FEHSS can be tailored to meet the power requirements of wearable sensors and gadgets [3]. Without cumbersome and rigid components, the FEHSS shows immense potential as a versatile power source to advance wearable technology and contribute to a sustainable future.

Reference:

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