

Sensor and energy storage devices

What are the key parameters of energy storage devices?

In this paper, the measurement of key parameters such as current, voltage, temperature, and strain, all of which are closely related to the states of various new energy storage devices, and their relationship with the states of those devices are summarized and explained, mainly for non-embedded sensors and embedded sensors.

What are the different sensing methods used in energy storage devices?

These are highly related to their states. Hence, this paper reviews the sensing methods and divides them into two categories: embedded and non-embedded sensors. A variety of measurement methods used to measure the above parameters of various new energy storage devices such as batteries and supercapacitors are systematically summarized.

What are the different types of energy-storage-device-integrated sensing systems?

We summarize the recent achievements of four main types of energy-storage-device-integrated sensing systems, including tactile, temperature, chemical and biological, and multifunctional types, considering their irreplaceable position in the fields of human health monitoring, intelligent robots, human-machine interaction, and so on (Figure 1).

Why do energy storage devices need a sensing system?

This makes the quality, reliability and life (QRL) of new energy storage devices more important than ever [8, 9, 10]. Therefore, an effective sensing system is crucial in their application.

What is a multi-sensing system with energy-storage devices?

In addition, the systems with energy-storage devices, especially multi-sensing systems with energy-harvesters and storage devices, can achieve continuous and stable wireless monitoring without external power supply, which is the major trend of the sensing field in the future.

What are the applications of energy storage devices?

Therefore they are widely used in many fields, e.g., in portable electronic equipment, electric vehicles (EV) and hybrid electric vehicles (HEV), transportation industry, aerospace, military industry, and biomedical equipment, as shown in Fig. 1. Various application fields of new energy storage devices

Advanced energy storage devices are essential to overcome the issues of environment and deficiency of fossil fuels. Recent research is emphasized to enhance sustainable, environmentally friendly, and renewable energy resources and storage techniques in order to mitigate atmospheric pollution [1, 2] addition, scientists are actively exploring hybrid ...

To achieve complete and independent wearable devices, it is vital to develop flexible energy storage devices. New-generation flexible electronic devices require flexible and reliable power sources with high energy

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density, long cycle life, excellent rate capability, and compatible electrolytes and separators. Besides, safety and cost should also be considered in ...

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Predictably, self-powered gas sensor with energy harvesting and high-sensitivity sensing, and self-charging power cell with energy harvesting and efficient storage will become hot topics. In this paper, we review the recent developments of flexible piezoelectric nanogenerators in flexible sensors and energy storage devices.

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When it comes to energy storage devices for sensors and actuators, the writers of this chapter are mainly concerned with this topic. The traditional energy harvesting methods will be addressed first, followed by self-powered portable and wearable devices with built-in sensing, which will be explored after that. The usage of self-powered systems ...

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Selected studies concerned with each type of energy storage system have been discussed considering challenges, energy storage devices, limitations, contribution, and the objective of each study. The integration between hybrid energy storage systems is also presented taking into account the most popular types. Hybrid energy storage system ...

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Accordingly, storage has been considered on all levels, from the tiny sensor needing electricity in regular intervals for reporting data by telemetry all the way up to international electric grids covering whole continents. ...

Flexible sensor and energy storage device based on piezoelectric nanogenerator Shen Mao-Liang Zhang Yan
???? Citation: Acta Physica Sinica, 69, 170701 (2020) DOI: 10.7498/aps.69.20200784

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Innovations in industrial automation, information and communication technology (ICT), renewable energy as well as monitoring and sensing fields have been paving the way for smart devices,...

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