

Overall, these smart devices offer different ways of recycling plastic waste and converting it into 3D hierarchical mesoporous carbon. Their excellent specific surface area and porous structure are platforms for other materials. ... Recycling material from already-used energy storage devices is a new trend, and the good performance brings ...

School energy and power engineering, Wuhan university of technology, Wuhan, Hubei, 430063, China * Corresponding author's e-mail: 2382574578@qq Abstract. Based on the research of Marine plastic garbage recovery method, the discussion of the recovery device and the understanding of the types of ships, this paper designs a multi-stage recovery device for ...

Keywords Metal-ion batteries ·Supercapacitors ·Renewable energy ·Recycling 1 **Introduction** With the increase in energy demands, the need for energy storage devices has also increased to replenish finite energy sources. The most used storage devices are batteries and supercapacitors (SCs).

Carbon-based materials synthesized from waste plastic by different techniques are efficiently utilized for sensors, biomedical applications, energy conversion processes, and energy storage devices such as ...

Conversion of Plastic Waste to Carbon-Based Compounds and Application in Energy Storage Devices. April 2022; ACS Omega 7(16) DOI:10.1021 ... after recycling, as usually plastics lose certain ...

dling plastic waste along with their integrated appli-cation in energy storage devices. Furthermore, chal-lenges and perspectives of the current study are also elaborated. 2 **Classification of Waste Plastics** Plastics are classied into many dierent types based on their uses. Some examples of daily use of plastics examples are described below:

The disposal/recycling of plastic materials are one of the biggest challenges of 21st century. Some studies have been reported in recent past on recycling of thermoplastics via three-dimensional (3D) printing as a novel technique under primary and secondary recycling. But hitherto no work has been reported on use of recycled/virgin thermoplastics for use as energy ...

Conversion of Plastic Waste to Carbon-Based Compounds and Application in Energy Storage Devices . × ... Insights of Recycling Valuable Materials Towards Environmental Sustainability ... Scientific Reports. The present study reports the upcycling process of waste plastics into value-added product graphene nanosheets (GNs) and their subsequent ...

The device structures, selection of materials, and operating environments play a crucial role in achieving

higher output from any energy harvesting device [21]. Recently, there is a quest to employ micro/nano energy harvesting devices based on piezoelectric and triboelectric effects for device engineering [22,23].

At UCR, we have taken the first steps toward recycling plastic waste into a rechargeable energy storage device. We believe that this work has environmental and economic advantages, and our approach can present opportunities for future research and development. Lithium batteries don't charge as fast as supercapacitors, but they store more energy.

Additionally, the non-biodegradability and often difficult and/or costly recycling of existing energy storage devices lead to the accumulation of electronic waste. To address these issues, there is a growing demand for renewable, cost-effective, and environmentally friendly energy storage materials to replace current components. 11,12

As compared to the incineration and landfilling processes, the better technique for waste management is waste plastics" recycling. 34 Generally, recycled polymers are more economical than new plastic, ... and low cost may empower the fast implantation of doped carbon-based materials obtained from PVC plastic into energy storage devices. 249.

These energy storage devices have their own characteristics and particular applications. Among these, SC evolved as a fascinating energy storage device which is lies between the capacitor and battery. ... As mentioned earlier, the treatment process for waste plastics such as recycling, energy recovery, and land filling are used. However, the ...

Scanning electron microscope image of a material for energy storage made from upcycled plastic bottles. (Mihri Ozkan & Cengiz Ozkan/UCR) In an open-access article published in Energy Storage, the researchers describe a sustainable, straightforward process for upcycling polyethylene terephthalate plastic waste, or PET, found in soda bottles and many other ...

Lithium-ion batteries and sodium-ion batteries are efficient electrochemical energy storage devices and have played a critical role in today"s portable electronic devices [66, 67]. ... strategies for microplastics degradation and plastics recycling. Adv. Sci., 9 (2022), Article 2103764. View in Scopus Google Scholar [11]

Recycling plastic waste efficiently and cleanly is one of the key ways to reduce environmental pollution and carbon emissions. At present, the disposal methods for waste plastics mainly include landfill, incineration, photodecomposition, and thermal cracking, which not only cause serious pollution but also a Plastic Waste Utilisation: A cross-journal collection 2023 Green Chemistry ...

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