Graphene battery negative electrode project environmental assessment

How effective is the recycling of graphite negative electrode materials?
Identifying stages with the most significant environmental impacts guides more effective recycling and reuse strategies. In summary,the recycling of graphite negative electrode materials is a multi-win strategy,delivering significant economic benefits and positive environmental impacts.

Is graphite a good negative electrode material?
Fig. 1. History and development of graphite negative electrode materials. With the wide application of graphite as an anode material, its capacity has approached theoretical value. The inherent low-capacity problem of graphite necessitates the need for higher-capacity alternatives to meet the market demand.

Can sulphur dioxide improve the performance of graphene electrodes?
In the report on current developments in the fabrication of graphene and related materials for high-performance LiB electrodes,Kumar et al. discovered that the addition of metal oxide or sulphur dioxide to graphene enhanced both its anode and cathode performances.

Can graphene nanosheets be used as negative electrodes?
Graphene nanosheets,which is another name for graphene,are being investigatedextensively for use as negative electrodes in energy storage devices. According to reports,the presumed particular capacity of GO is 744 mAh g -1,which is twice that of 3D graphite (372 mAh g -1).

What are the environmental effects of graphene synthesis using SG and PSG?
The environmental effects of graphene synthesis using SG and PSG were analyzed using a life cycle assessment (LCA) approach. The LCA results show that electricity consumptionis the most influential factor among the five indicators analyzed,i.e.,fossil fuel depletion,acidification,smog,global warming,and ozone depletion.

Why are graphene-based electrodes used in electrochemistry?
(American Chemical Society) Graphene-based electrodes have been widely tested and used in electrochem. double layer capacitors due to their high surface areaand elec. cond. Nitrogen doping of graphene has recently been demonstrated to significantly enhance capacitance,but the underlying mechanisms remain ambiguous.

With the emergence of portable electronics and electric vehicle adoption, the last decade has witnessed an increasing fabrication of lithium-ion batteries (LIBs). The future development of LIBs is threatened by the limited reserves of virgin materials, while the inadequate management of spent batteries endangers environmental and human health. According to the ...

Environmental footprints of state-of-the-art graphite recycling are quantified using life cycle assessment to

strengthen the implementation of circular battery approaches. Since their commercialization in the early 90s, the demand for lithium-ion batteries (LIBs) has increased exponentially.

Due to their abundance, low cost, and stability, carbon materials have been widely studied and evaluated as negative electrode materials for LIBs, SIBs, and PIBs, including graphite, hard carbon (HC), soft carbon (SC), graphene, and so forth. 37-40 Carbon materials have different structures (graphite, HC, SC, and graphene), which can meet the needs for efficient storage of ...

Graphene and its derivatives are heralded as "miracle" materials with manifold applications in different sectors of society from electronics to energy storage to medicine. The increasing exploitation of graphene-based materials (GBMs) necessitates a comprehensive evaluation of the potential impact of these materials on human health and the environment. ...

Here, a strategy of smartly converting retired Li-ion battery anodes to graphene and graphene oxide is proposed. The graphite powders collected from end-of-life Li-ion batteries exhibited irregular expansion because of the lithium-ion intercalation and deintercalation in the anode graphite during battery charge/discharge. Such prefabrication ...

To enable sustainable paths for graphite recovery, the environmental footprint of state-of-the-art graphite recycling through life cycle assessment is analyzed quantifying the contribution of...

Using graphene as a negative electrode material for lithium batteries can significantly improve the charge and discharge efficiency of the battery, mainly due to its

The demand for high performance lithium-ion batteries (LIBs) is increasing due to widespread use of portable devices and electric vehicles. Silicon (Si) is one of the most attractive candidate anode materials for next generation LIBs. However, the high-volume change (>300%) during lithium ion alloying/de-alloying leads to poor cycle life. When Si is used as the ...

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