Uranium battery electrode material

Abstract Redox-active organic materials are emerging as the new playground for the design of new exciting battery materials for rechargeable batteries because of the merits including ...

A kind of iron-carbon composite for efficient electrosorption of uranium from radioactive wastewater was prepared by simply carbonization of cellulose and ferric nitrate, and the uranium electrosorption performance and behavior of the iron-carbon composite as flow electrode active material were investigated for low-concentration (below 50 mg/L) uranium-containing wastewater.

Herein, by means of first-principle calculations based on density functional theory (DFT), the electrochemical properties of monolayer VS 2 (M-VS 2), double-layer VS 2 (D-VS 2) and bulk VS 2 (B-VS 2) as electrode materials for Mg-ion batteries (MIBs) were comprehensively explored.The computation results reveal that Mg atom can strongly bind with ...

Special aspects of using CuS as electrode material are the complex Cu-S phase diagram, which shows several non-stoichiometric compounds, such as Cu 2- x S. Compared to FeS 2, the energy density of CuS is lower, but it is much softer, shows a slightly higher cell voltage, and a smaller volume expansion.

Herein, it was aimed to propose an easy engineering technique to fabricate an architecture of uranium-anchored carbon nanotubes that could be employed as an electrode ...

Abstract Redox-active organic materials are emerging as the new playground for the design of new exciting battery materials for rechargeable batteries because of the merits including structural diversity and tunable electrochemical properties that are not easily accessible for the inorganic counterparts. More importantly, the sustainability developed by using ...

The redox flow battery using uranium as the negative and the positive active materials in polar aprotic solvents was proposed. In order to establish the guiding principle for the uranium compounds ...

The different electrode materials used in RFBs are listed in Table 2.8. 2.6.3 Carbon-Based Electrodes. Carbon-based electrodes are the most commonly used for RFBs. In highly oxidising environments ... Y. Shiokawa, T. Yamamura, K. Shirasaki, Energy efficiency of an uranium redox-flow battery evaluated by the butler-volmer equation. J. Phys. Soc. ...

As shown in Fig. 4a, the uranium extraction uptake increased with increasing applied voltage and reached the maximum uptake of 1759.85 mg/g at 1.0 V, which is about 2.3 times higher than ...

During the course of 24 days, the electrodes in the experiments conducted on seawater gathered from the Bohai Sea retrieved 12.6 milligrams of uranium per gram of water. The capability of the coated material ...

Uranium battery electrode material

Conventional chemical or "galvanic" batteries, like the lithium-ion cells in a smartphone or the alkaline batteries in a remote, are great at putting out a lot of power for a short amount of time.

ETDEWEB / / Development of the uranium redox flow battery for power storage as efficient usage of depleted ... (IV)/U(III) electrode reaction, and the effects of counter ions, ClO{sub 4}{sup -} and OTf{sup -}, and electrode materials, Pt and Hg, on the electrolytic reduction of U(IV) to form U(III) in dimethylformamide (DMF) solutions by using ...

The two electrodes are made of EDLC-type electrode (i.e., materials from carbon family) and pseudocapacitive type electrode (i.e., materials from metal oxide and conducting polymer) or battery-type electrodes . Depending on the assembly and type of electrode used, hybrid supercapacitors can be classified in different classes.

Cathode materials. Electrode materials are the basic components in the development of any battery as they have a significant role in the electron transfer mechanism. Therefore, the development of high-performance cathode materials with a suitable electrolyte and aluminium foil as an anode is crucial for AIBs.

Supercapacitors and batteries are among the most promising electrochemical energy storage technologies available today. Indeed, high demands in energy storage devices require cost-effective fabrication and robust electroactive materials. In this review, we summarized recent progress and challenges made in the development of mostly nanostructured materials as well ...

Nevertheless, among various types of discarded lithium battery electrode materials, limited research has been conducted on the recycling of ternary electrode materials (LiNi x Co y Mn 1-x-y O 2). This study proposes an eco-friendly process for the efficient recovery of valuable metals and carbon from mixed materials of discarded ternary lithium ...

An atomic battery, nuclear battery, radioisotope battery or radioisotope generator uses energy from the decay of a radioactive isotope to generate electricity.Like a nuclear reactor, it generates electricity from nuclear energy, but it differs by not using a chain reaction.Although commonly called a batteries, atomic batteries are technically not electrochemical and cannot be charged ...

Fabrication procedure of the 3D cathode and structure of flexible battery, cross-section image of the designed cathode and electrochemical performances: a) Schematic of the fabrication process of the V 2 O 5 HoMSs/Ni-cotton fabric electrode, b) Schematic of the structure of the flexible battery, c) Cross-sectional SEM images of the fabric ...

The U-GO 5 electrode-based-supercapacitor cell offered the highest performance metrics with a 95.92 % capacitance retention value at the end of the 15,000 consecutive galvanostatic ...

The electrochemical method is emerging as a novel approach for uranium extraction [10], [11], [12], [13]

comparison with traditional adsorption methods, electrochemical separation expedites the diffusion rate of uranium ions on material surfaces while circumventing subsequent charge repulsion by converting them into neutral species [14], [15], [16].

Therefore, the recovery of uranium is of great importance. Here, an in situ electrolytic deposition method to extract uranium from aqueous solution is reported. A functionalized reduced graphene oxide foam (3D-FrGOF) is ...

Abstract. The electrochemical behavior of uranium (IV) tetrachloride in ionic liquid-DMF mixture was studied for the first time in order to build a redox flow battery (RFB) using U as an electrode active material.

The electrosorption of U(VI) using a batch-mode CDI system is depicted in Scheme 1.The CDI cell includes a pair of CS/BC membranes (on the surface of titanium plates) as the electrodes (length 2 cm × wide 2 cm) which were separated by 2 mm distance using a non-conductive plastic hollow spacer. 50 mL of U(VI) solution was circulated through the CDI cell ...

An interesting production method for a new material to be used as electrode was reported by I. Mustafa and colleagues. They produced a macro-porous carbon nano-foam by implementing a freeze-drying step in their tape casting fabrication method. Using these electrodes, their cell achieved an EE of ca. 80% at 50 mA cm -2 for 100 cycles .

Electrochemical Studies of Uranium (IV) in an Ionic Liquid-DMF Mixture to Build a Redox Flow Battery Using Uranium as an Electrode Active Material March 2021 Chemistry Letters 50(6)

Therefore, the recovery of uranium is of great importance. Here, an in situ electrolytic deposition method to extract uranium from aqueous solution is reported. A functionalized reduced graphene oxide foam (3D-FrGOF) is used as the working electrode, which acts as both a hydrogen evolution reaction catalyst and a uranium deposition substrate.

As an emerging materials platform, COFs possess many distinct merits when applied as electrode materials for rechargeable metal-ion batteries: (1) ... future efforts should not only focus on the properties of active materials but also pay more attention to the electrode and battery assembly as well as full-cell performance. ACKNOWLEDGMENTS.

Layered lithium intercalating transition metal oxides are promising cathode materials for Li-ion batteries. Here, we scrutinize the recently developed strongly constrained and appropriately normed ...

Any electronically conductive material can act as an electrode when placed in an ionically conductive medium that provides suitable reaction partners for the charge and ...

An effective method for adjusting the porosity of battery electrodes and enhancing their performance is

through the application of bi- or multilayer coatings. By applying coatings with different material properties, the pore size and distribution of the electrode can be modified to ensure an increased diffusion rate of ions and electrons.

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