Power Solutions

Nitric acid solar container nuclear power plant

Overview

The degradation of reprocessing materials to nitric acid corrosion in aqueous spent fuel nuclear reprocessing plants is an unwanted and serious issue. Among the countless of chemical threats, boric acid (H3BO3) and nitric acid (HNO3) present unique and formidable challenges. Boric acid is extensively used in pressurised water reactors (PWRs) as a neutron absorber, while nitric acid plays a critical role in nuclear fuel reprocessing and plutonium. Used nuclear fuel has long been reprocessed to extract fissile materials for recycling and to reduce the volume of high-level wastes. Recycling today is largely based on the conversion of fertile U-238 to fissile plutonium. New reprocessing technologies are being developed to be deployed in. Westinghouse offers innovative solutions to meet customer’s decontamination and effluent waste treatment needs. Westinghouse addressed these needs by developing a variety of chemical decontamination processes and delivery systems. Westinghouse has four different, off-the-shelf, field ready systems. Ltd has a long history of reprocessing nuclear fuel from both UK nuclear reactors and for overseas customers. During reprocessing uranium and plutonium are recovered from spent irradiated fuel to recycle into new fuel. The remaining fission products are immobilised into a stable glass matrix in the. In spent nuclear fuel reprocessing plants, nitric acid is the main process medium used for the separation of fission products, unused uranium and plutonium from irra-diated nuclear fuels by the well-proven PUREX (Plutonium Uranium, Reduction, EXtraction) process in the form of uranyl nitrate and. In Canada, the proposed disposal method for high level nuclear waste involves sealing the waste in steel containers with a 3 mm outer copper coating and burying it in a deep geologic repository. However, the thickness of the container is significantly reduced making a reassessment of the influence.

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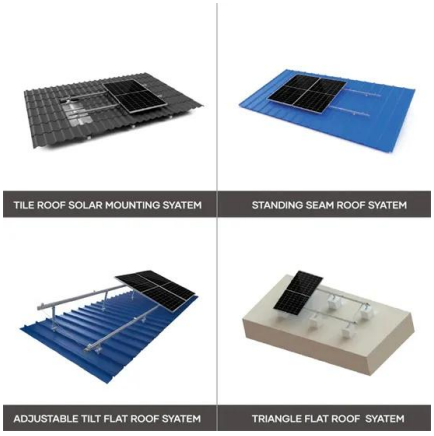
Scheme of solar-assisted nitric acid and fertilizer production.

Solar fertiliser production including the internal utilisation of the side-product oxygen is analysed as one promising example of an innovative process utilising renewable energy resources and

NITRIC ACID SAFETY

Nitric acid is a highly corrosive mineral acid and strong oxidizer used primarily for nitration of organic molecules and washing glassware or metal equipment. Nitric acid reacts violently with alcohols, ...



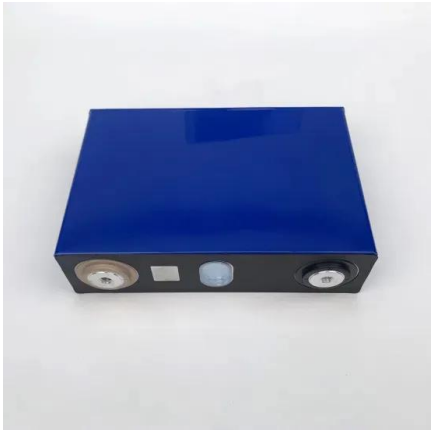
Energy optimization of a network of exchangers-reactors in a nitric

The aim of this work is to improve heat recovery in a nitric acid production plant using process integration. The studied plant produces 1340 tons of 58 % nitric acid per day and the necessary data ...

Design of the Reactor Containment and Associated Systems for ...

The standards are also applied by regulatory bodies and operators around the world to enhance safety in nuclear power generation and in nuclear applications in medicine, industry,

agriculture and research.

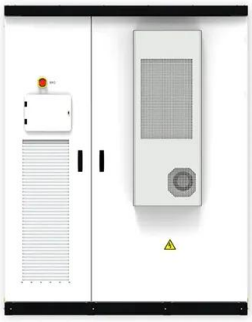


Ammonia from nuclear power ISSE 391 Ammonium nitrate ...

Stamicarbon explores the latest advancements in tertiary abatement technologies, their implementation in nitric acid plants, and the implications for the fertilizer industry.

Nitric Acid Corrosion Issues of Spent Fuel Nuclear Fuel ...

Zirconium and its alloys exhibit superior resistance to corrosion in high and concentrated nitric acid than stainless steel at elevated temperature; it has been used as structural material successfully for ...



"Effect of Nitric Acid on the Corrosion of Copper-Coated Nuclear Fuel

Nitric acid had only a minor effect on the corrosion rate. Scanning electron microscopy (SEM) showed that the deposition of corrosion products prevented significant corrosion penetration.

Processing of Used Nuclear Fuel

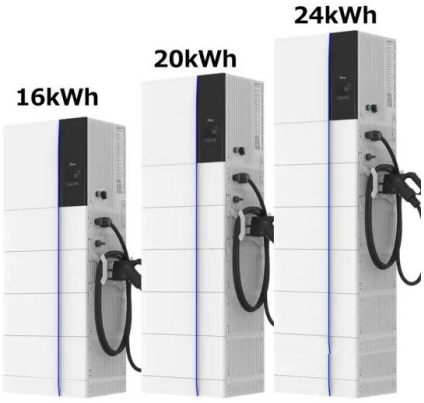
A key, nearly unique, characteristic of nuclear energy is that used fuel may be reprocessed to recover fissile and fertile materials in order to provide fresh fuel for existing and future ...

Energy Analysis of Nitric Acid Process

Commercial nitric acid plants are operated by two methods - mono pressure and dual pressure. In the present work an attempt has been made to carry out energy analysis of mono high pressure nitric ...

Chemical Decontamination Solutions

Applications such as the NITROX-E decontamination process were developed to remove radionuclides for sub-system dose reduction and full-system decontamination (FSD) projects. The process is ...



Nitric Acid Corrosion Issues of Spent Fuel Nuclear Fuel Reprocessing

Zirconium and its alloys are thus considered candidate materials for various applications in spent nuclear fuel reprocessing plants involving nitric acid of high concentrations at high

The Influence of Radiolytically Produced Nitric Acid on the Corrosion

Under humid aerated conditions, the formation of nitric acid is expected, potentially resulting in the formation of droplets or wetted layers on the container surface. Currently available ...

Nitric Acid Corrosion Issues of Spent Fuel Nuclear Fuel ...

In spent nuclear fuel reprocessing plants, nitric acid is the main process medium used for the separation of fission products, unused uranium and plutonium from irra-diated nuclear fuels by the well-proven ...

Mechanism of dissolution of nuclear fuel in nitric acid relevant to

The mechanism of dissolution of sintered UO2 fuel pellets in nitric acid is the essential starting input information required for the design of a continuous dissolution system for spent nuclear ...

Corrosion of Nuclear Reactors by Boric and Nitric Acids: ...

This article explores the corrosion processes driven by boric and nitric acid, delving into chemical reactions, their effects on common and specialised steels, and metallurgical implications.

Comparative corrosion behaviour of different alloys for nitric acid

Abstract In nuclear spent fuel reprocessing plants in India, austenitic stainless steel (SS) 304L serves as the structural material for critical components that handle boiling nitric acid. SS 304L ...

Corrosion of Nuclear Reactors by Boric and Nitric Acids: A Core Concern

In the nuclear industry, the integrity of structural materials is paramount for ensuring safe and reliable plant operations. Among the countless of chemical threats, boric acid (H3BO3) and nitric

Copenhagen Atomics - the nuclear power plant in a container

Copenhagen Atomics is a young company that has set itself the goal of building Small Modular Reactors with new technology and a new concept, namely modular. The idea is to build ...

Floating Nuclear Reactors Bring Power To Ports

Can nuclear microreactors solve port pollution? Video used courtesy of Westinghouse To reduce emissions, the maritime industry is exploring several opinions, including floating nuclear ...

Nitric Acid Corrosion Issues of Spent Fuel Nuclear Fuel Reprocessing

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The Influence of Radiolytically Produced Nitric Acid on the Corrosion

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Nitric Acid Corrosion Issues of Spent Fuel Nuclear Fuel Reprocessing

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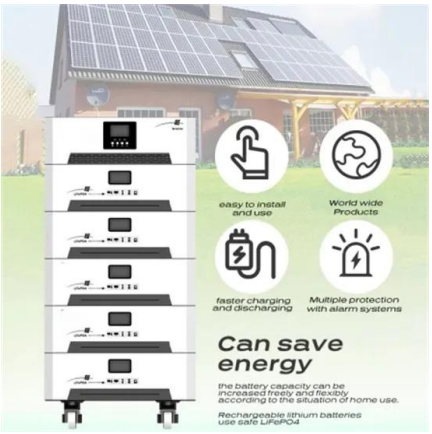

Radioactive waste management at nuclear power plants

However, nuclear power plants are the largest in number among all nuclear facilities and produce the greatest volume of radioactive wastes. The nature and amounts of wastes produced in a nuclear ...

Next-generation solutions for water sustainability in nuclear power

Nuclear power plants (NPPs) are crucial for meeting global energy demands but face significant challenges due to their high water consumption, especially in water-scarce regions. These ...

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