Solar Energy South Africa

Sofc system Cuba

Sofc system Cuba

Thermal study of a SOFC system integration in a fuselage of a ...

As a design constrain, the SOFC system has to be installed inside the UAV fuselage with the lowest possible offset, to reduce the volume and mass of the UAV. Due to the high operating temperature of the SOFC (800-1000 °C), the external temperature of the system is always about few hundred Celsius degrees. Solid Oxide Fuel Cell (SOFC

Polygeneration systems based on high temperature fuel cell ...

In order to model the SOFC system presented by Fong et al. [20], Seven scenarios considering a solid oxide fuel cell with a 60% fuel-to-electric conversion efficiency and a heat recovery exhaust temperature of 100 °C are developed by McLarty et al. [90]. The scenarios include a simulation of 16 building varieties across the lower 48 states

About Solid Oxide Fuel Cells

A SOFC system consists of a power generation unit and a backup heat source unit. The power generation unit generates electricity and at the same time recovers the exhaust heat generated during power generation and stores it as ...

Solid oxide fuel cell: Decade of progress, future perspectives and

Among these, SOFC is a high temperature fuel cell that use solid electrolyte, typically dense Yttria-stabilized zirconia, for its operation [10].Furthermore, as compared to other fuel cells, the SOFC allows the use of variety of fuels such as hydrogen, hydrocarbons, carbon monoxide etc. [11] Besides their several advantages, SOFC's have high operational ...

Novel SOFC system concept with anode off-gas dual ...

Design and optimization of a combined fuel reforming and solid oxide fuel cell system with anode off-gas recycling[J] Energ Conver Manage, 52 (10) (2011), pp. 3214-3226. View PDF View article View in Scopus Google Scholar [29] Y. Kawabata, T. Nakajima, K. Nakamura, et al.

Thermodynamic analysis of 100% system fuel utilization solid oxide fuel

In order to realize the DEA loop system for ammonia-fueled SOFC system, it is critical to remove nitrogen and water from the anode off-gas, unlike only water condensation is required in the case of a hydrogen-fueled SOFC system [34]. The most common techniques used for nitrogen separation are solvent adsorption, pressure swing adsorption, and

Fuel flexibility study of an integrated 25kW SOFC

reformer ...

grated 25kW SOFC reformer system operating on each of these fuels is followed by experimental tests of selected fuels in the 25kW SOFC system. The baseline compositions used in the current study are presented in Table 1 and have been determined based on data from the literature [8-10]. 2. Twenty-five kilowatt SOFC system description

Design and Control of an SOFC/GT Hybrid Power Generation System ...

The process design, simulation, and control of a solid oxide fuel cell (SOFC)/gas turbine (GT) hybrid power generation system combined with a compressed-fuel processing unit (CFPU) are presented. Given that CO2 is the input of the CFPU, the net CO2 emissions of this hybrid power system are suppressed under 324.2 g of CO2/kWh. Using the combined heat and power ...

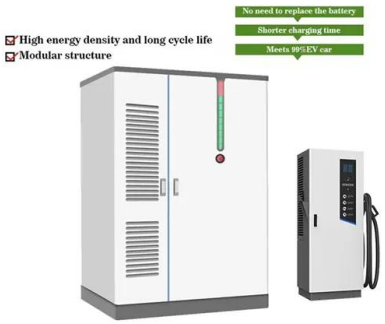
Electrolysis & SOFC fuel cell system , Bosch Hydrogen Energy

Electrolysis & SOFC fuel cell system With the SOFC fuel cell system and the PEM electrolysis stack, Bosch develops large-scale industrial hydrogen solutions for your business. Hydrogen is a versatile energy carrier for decentralized electricity and heat generation.

Comparison and analysis of heat exchange and off-gas recycle ...

Steam reforming (SR) is the most common way

to produce hydrogen [22, 23] and is widely adopted by the SOFC systems [15, [24], [25], [26]].Some researchers also proposed dry reforming (DR)-SOFC system [19, 27] and partial oxidation reforming (POR)-SOFC system [28, 29].SR and DR are endothermic reactions which requires considerable amount of heat, ...



Report on the Status of the Solid Oxide Fuel Cell Program

to develop system s of one megawatt or higher capacity. The Program is taking early steps to use a SOFC to capture the abundant energy available from coal via coupling with a gasifier. These steps should continue to be expanded. There has been progress towards the goal of practical and sustainable solid oxide fuel cells, but

Fault-tolerant control for steam fluctuation in SOFC system with

Faults of solid oxide fuel cell (SOFC) systems can affect the characteristics of the stack and inhibit SOFC system commercialization. It has been found that the temperature fluctuation of the burner caused by fluctuation of steam flow rate would greatly affect the temperature of SOFC system and even exceed the safe operation range. Firstly, this paper introduces a mathematical model for ...

On the Technology of Solid Oxide Fuel Cell (SOFC) ...

This paper presents a comprehensive overview on the current status of solid oxide fuel cell (SOFC) energy systems technology with a deep insight into the techno-energy performance. In recent years, SOFCs have ...

SOFC (Solid Oxide Fuel Cell) Stack

SOFC (Solid Oxide Fuel Cell) is a highly energy-efficient power generation system. A SOFC can generate energy by chemically reacting fuel (hydrogen) and oxygen, and also supply energy as heat. Kyocera has engaged in the development of miniaturized SOFC technologies since 1985, and we succeeded in installing our SOFC cell stack on the world's

Dynamic modeling and analysis of a 5-kW solid oxide fuel cell system

Based on the requirement for a high-temperature environment, the SOFC stand-alone power system should take full advantage of the heat from electrochemical reactions to achieve self-sustainability and promote efficiency [5].Therefore, the hydrogen-fueled SOFC system proposed in this paper is consist of the SOFC stack, the control system, and the ...

SOFC FAQs

A solid oxide fuel cell (SOFC) produces electricity and heat from a fuel source such as methane, biogas or hydrogen. A solid oxide electrolyser (SOE) or Solid Oxide Electrolysis Cell (SOEC)

converts water in the form of steam into hydrogen and oxygen. A SOFC or SOE system is composed of several components in addition to the stack, such as

Fault diagnosis of SOFC system based on single cell voltage analysis

SOFC has become a promising energy conversion device due to high efficiency, fuel flexibility and all-solid-state structure [[1], [2], [3], [4]].A technical bottleneck facing SOFC commercialization currently is the low reliability and durability [5, 6].According to the U.S. Department of Energy, the lifetime of a stationary SOFC system should not be less than ...

Soft computing analysis of a compressed air energy storage and SOFC

Mojaver et al. [12] investigated an integrated SOFC, with two different kinds of electrolytes, including oxygen ion-conducting (SOFC-O 2-) and proton-conducting (SOFC-H +), and organic Rankine cycle (ORC) cycle.They compared the performance of the two SOFCs at their optimum conditions and found out that the SOFC-O 2-has higher exergy and energy ...

Planar SOFC system modelling and simulation including a 3D

...

Fuel cell system modelling in a process simulator, such as Aspen Plus, has been undertaken in several previous studies. Zhang et al. [16] created a SOFC system simulation by using inbuilt reactor modules. FORTRAN programming and data post-processing subsequently enabled the authors to simulate a tubular SOFC plant that was validated against a 100 kW ...

Thermodynamic performance comparison of a SOFC system ...

This work investigates the thermodynamic analysis of syngas production from several fuels by steam reforming or dry reforming for SOFC-integrated systems. Four commonly used fuels are considered: methanol and glycerol (alcohols), methane, and diesel (hydrocarbons). The integrated system is modeled on Aspen Plus using the Gibbs free energy minimization method and a ...

Techno-economic assessment of decentralized low-carbon power ...

In this regard, the Solid Oxide Fuel Cell (SOFC) system is at the forefront of the energy revolution due to its exceptional efficiency and versatility. SOFCs, in contrast to conventional combustion ...

Analysis and optimization of solid oxide fuel cell system with ...

Further, solid oxide fuel cell system offers the potential to supply high-temperature heat to industrial applications, embodying the concept of combined heat and power plants. To maximize heat availability, cathode-off gas can partially be blended with the fresh air entering the stack. Various anode-off gas and cathode-off gas recirculation

SOFC system and technology

Compact size solid oxide fuel cells (SOFCs), which will be operated at reduced temperature, are becoming a frontier of R and D. These compact size SOFCs will fit well with intermittent loads, of which share in energy system is increasing today, whereas the "conventional SOFCs" will be effectively operated with stationary mode.

SIEMENS WESTINGHOUSE: 25 KW TUBULAR SOLID ...

The system is projected to operate for up to 20,000 hours, after which time the system may be retired to the Smithsonian Museum as the "world's first integrated solid oxide fuel cell system." CURRENT PROJECTS . Two students (Undergraduate Joan Morrison and Graduate Thomas Smith) are currently conducting research using the 25 kW SOFC system.

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