

Discussion on new Clean energy fuel cell

Zhang yong¹, Cao kun¹,

¹ Shandong Province Pingyi County power supply Company

Abstract: fuel cells have unusual performance: Clean and efficient, power efficiency up to 60% above, and can be serviced with partial load running, there is virtually no except for low carbon oxides emissions Harmful emissions. The article describes the principles and classification of fuel cells, highlighting its product performance and application prospects.

Keywords: Clean; Efficient; fuel Cell

A fuel cell converts the chemical energy of a fuel directly convert to electric power generation device, It utilizes the converse of hydro solution principle, through electrolyte separated by 2 Electrodes in the middle fuel (Natural gas, methanol or pure hydrogen) Chemical Anti-of the should generate power directly, because fuel cell is not a heat engine, It does not need to withstand the thermodynamic loss of the Heat engine. Item, so theory, which is close to 100% running with thermal efficiency, has a high economics. The various fuel cells that are currently in operation, from Restrictions on various technical factors, then consider the entire appliance system Energy dissipation, Total conversion efficiency in 45%~60% Scope, such as Consider the use of heat to the top 80% above. also, fuel Power He Appliance does not contain or contains very few moving parts, working reliably, less need repair, and quieter than conventional generator sets. additionally electrochemical reaction clean, full, rarely produce harmful substances. All of this makes the fuel cell considered to be a very have Future Energy Power units.

1. Fuel cell classification

The fuel cell technology currently developed by has a on the operating temperature Different types, from room temperature slightly higher until up to L°C for scope. Most industrial companies focus on the under 4 on the main type of:

- (1) The temperature is running at 60-80°C Polymer electrolysis between liquid diaphragm fuel cell (PEMFC);
- (2) The temperature is running at 160-220°C A class of phosphoric acid burns between battery (PAFC);
- (3) The temperature is running at 620-660°C molten carbonate between Salt fuel cell (MCFC);
- (4) The temperature is running at 880-1000°C Solid oxygen between Chemicals fuel cell (SOFC).

You can divide these types of fuel cells into low temperature type (100°C and below), medium-temperature (about 200°C around) and high warm (600-1000°C) fuel cell. medium temperature and high temperature type fuel cells are suitable for use on stationary devices, and low-temperature combustion The material battery applies to both static and mobile appliances. real The power capacity of the appliance varies greatly, can give a notebook computer and mobile phone power (number of W Meter), can also give the home in Residence (number KW) or dispersed electrothermal and power devices (hundreds of KW to few MW) power supply.

2. Low-temperature fuel cell

Low-temperature fuel cell products commonly used proton exchange membrane ignition battery (PEMFC), Direct methanol fuel cell (DMFC) and hydrogen fuel cells, These battery products are available at room temperature

Copyright ©

This is an open-access article distributed under the terms of the Creative Commons Attribution Unported License

(<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

operates.

where proton exchange membrane fuel cell (PEMFC), Direct methanol fuel cell (DMFC) has small size, Smoke light, Benefits of square on battery heap design without power, regulator charging, Supplemental fuel only takes a few seconds, provides great convenience for consumers, available as portable electronics devices such as phone, Note-taking computers, personal digital assistant (PDA), even digital camera and camera power, With has broad application prospects.

current Sharp company in direct methanol fuel cell (DMFC) has made rapid progress, created this type of Fire Battery power density high, reach 0.3W/cc, Power

density is an ordinary alkaline battery Times, Lithium Battery 6 Times; and Japan Matsushita Institute nonporous Development of Household polymer electrolyte fuel cell (polymer electrolyte fuel cell, PEFC can) use 4 million hours and 4000 cycle weeks period, This kind of home power battery product is about to go into mass yield.

hydrogen fuel cells are commonly used as new vehicle energy, hydrogen fuel The battery car has also been considered the future direction of automotive development This car doesn't need petrol, But by hydrogen chemical reaction after production Live Current driver, emit pure water, just because of for Low Energy, Zero emission features. currently in the countries of Europe, Japan, Korea, etc hydrogen fuel vehicles have entered the commercial stage, Our country start late, But research on hydrogen fuel cells for automobiles nonporous Progress quickly, hydrogen fuel cell vehicles developed by Shanghai surpass Third fuel cell weight No. 275KG, power up to 5kw, Top speed exceeded, KM.

3. Medium-Temperature fuel cell

Current Phosphoric acid fuel cell (PAFC) is development time maximum, fuel cell with the most advanced technology, year age, IFC (International Fuel Cell company) Decision on its prior commercialization Line investment, Manufacturing and sales kW PAFC install set, and put it on the market. toshiba in end of year has worked hard to make PAFC Technology go to commercial market. from this, PAFC Technology has been used in the rest of the fuel cell market to opposition. so far, Global installed Multiple sets PAFC fuel cell devices.

Research nonporous indicates that, This fuel cell failed to implement marketers The reasons for the for business are generally as follows:

(1) The highest power efficiency is 40%, will be after the maintenance period expires To 35% even lower. Under normal circumstances the device's make with no more than 20000 runsh.

(2) Some experimental devices such as Toshiba's managed 1 Set One The appliance failed to reach the peak performance level.

(3) The United States and Japanese governments slash significantly for PAFC Investment in technology research and development.

(4) experience accumulated so far and in improving design parameters and reducing product cost potential see, let PAFC Technology The possibility of successfully joining the Market today is very low.

4. High-temperature gas battery

4.1 features of high temperature fuel cells

The high temperature fuel cell has many suitable for static mounted The attributes used on the reset. However, a longer heating process is required before a high temperature fuel cell produces before the power is out, So this technique The operation cannot be applied to various utilities that require frequent start in a short period of time. also, High temperature fuel cell also has the following features:

(1) The does not require the use of precious metals to catalyze electrochemical reverse should be, Use ceramic material.

(2) to CO is completely unrestricted. CO participate to electrochemistry The reaction process is similar to the H₂-sample is oxidized.

(3) displays high flexibility for fuel. You can Supply Natural gas-class fuel cell power generation equipment in the,

","The gas is converted to a ratio and (3) on the set. This means no external Fuel, greatly simplifies balancing of power generation devices

question.

(4) High temperature can connect a gas turbine to the system, in this case, the fuel cell power generation device is in the Paruns under pressure, and does not consider gas turbine output. Increase the power density of the fuel cell by approximately 20% in the case of () so that the overall efficiency is increased 10%, can be reduced exponentially to make use of the term cost.

(5) Higher operating temperatures also provide more for hot exhaust flexibility. In the power efficiency 60% or higher level, union limit waste heat emissions in the circulatory system, and under single loop emits more heat.

4.2 high Temperature combustion cell technology

MCFC and SOFC is the for this type of high-temperature fuel cell technique. They use different materials. MCFC on pottery, liquid metal carbonate in porcelain containers as electrolyte, if no measures are taken to prevent aging of electrodes, fuel power service life is affected by.

In MCFC the electrochemical reaction in is determined by the (: O₃ ion raise. MCFC with cheek-type battery, and SOFC type of tube design comparison, this kind of cheek-type electricity has power density slightly higher. This is more cost than SOFC appliance. Excellent more. But on the other hand, due to SOFC ceramic material very stable, available in 950-1000°C scope, so SOFC appliance is more advantageous in anti-aging performance. To the current up to, all long battery tests and running tests group all indicate SOFC appliance life can be up to 70000-80000h, is MCFC of the type 2 times.

MCFC and SOFC two techniques for 100-250 kW work rate range single-loop field test, cost significant down. Current dominance of MCFC development is United States Fuel Cell Energy Company and its granting in Germany Authority MTU, Japan's [13] [11]^view"; [11^-1^; 1:: [11^ Heavy industry (IHI) and Mitsubishi Corporation etc. and Siemens Westinghouse on SOFC advanced on development.

4.3 SOFC potential in the distribution market

Economic Promotion, Improvement of people's living standards, person mouth increasing, the spread of industrialization and so on world energy supply creates great pressure, but with oil and fossil fuel price the rising of the grid and the growing concern about environmental pollution. Note, World's need for using clean energy to generate electricity more and more. High, This is bound to drive solid oxide fuel cells (SOFC) city field development. and demand for distributed power, and significant costs for construction and maintenance of traditional transmission and distribution systems, The also provides a machine for the promotion of solid oxide fuel cell technology will. North America and Europe are considered to be SOFC fuel cell Technology most promising market.

expects solid oxide fuel cells to be in the next few years strong growth, One of the main areas of application is fixed power station. Global Industry analyst forecasts Japan from year years to 2015 Year solid oxide fuel cell market will reach 8.81% Composite Annual growth rate for; U.S. and European markets in % Year reach 3 billion \$.

4.4 SOFC Extension of the technology application

Discussion on how to improve service satisfaction rate of power supply window

Jiangsu Province Liyang power supply company Shang

Summary with socio-economic development, Power system reform continues to deepen, The oversight mechanism continues to improve, customers are increasingly looking to power supply services, customers are the basis for the survival and development of power supply enterprises. The window service directly close tied to the image of the power company. This article analyzes two factors affecting customer satisfaction quality of service, Service Mode, proposes some specific measures to improve window service satisfaction, by improving your service content and business type Understanding degree, doing business with customers, Improve the window staff business skills, and other specific

means to effectively improve the power supply window service satisfaction,Foster Customer Trust,feel secure,to guarantee the service of the power supply enterpriseimage and branding.

Services can create benefits,Services can generate profits,Quality services are the service concept that the power supply department has always emphasized.to important indicators for measuring quality of service""Service satisfaction","is one aspect of unremittingly.How to open up work ideasRoad,Efforts to address the relationship between the customer and the power supply company,actually do a good job of quality services,strives to implementtheCustomer satisfaction,is the power supply company must do,makegood long work.

The satisfaction rate is when a customer accepts a service,CustomerThe difference between the actual perceived service and the expected service.guestusers' expectations are related to the cost of theirpay,paid costGao-,more Gao expectations.

two,affect"window Service satisfaction"factor analysis for

1. Quality of service

window Quality of service includes counter servicein the course of the counter staffquality,related business question answers and servicescan,The level of proficiency of the counter staff to the Customer windowThe impression that leaves when paying a fee.duringpower consumption,on enjoy powerCompany Services,power supply Company's services,is alsoTheprocess of its perception of corporate services,final knotfruit in,Customer Satisfaction.

2. Service Mode

The Counter service of the window is to accept customer demand for electricity andAll power services.accepted business matters go directlyto the Power Force Marketing Management Information System process,by electronic work summonsforms a closed-loop process processing.

Example of a resident contribution,Household Tariff collection method hascounter charge services,automatic teller machine services,Bank debit andPOSMachine card etc,find and develop appropriate delivery servicesmethod,convenience customers buy Power services products,enjoyand Benefits,and more customers to enjoy better after-sales service isThe important embodiment of the service approach is.

three,improve"Windows Customer satisfaction"Horizontal recommendationand Countermeasures

1. Improve understanding of service content and business categories

Customer service work for the window mainly includes customer reception,

use natural gas as fuel forSOFCis a car-mountedto,Its extended application can have several forms:

(1)Home Application:A newgeneration of fuel cells will be flatTubular,Its power density is currently cylindrical fuel powerPool technology2times,thus creating a5kWFuel cell Mountset.This design is feasible,in the distribution market can beto replace the cylindrical fuel cell.

(2)1CMWabove the system appliance:obviously,as long asSOFCTechnology occupies power range in250-1cmwMarket,Then the next step is to strive for possessionHMWmoreMarket for large-scale power generation equipment.through moreSOFClinksto achieve this goal,also meet high efficiency lowThis request.2 (MWlevel scale fuel cell power efficiency of the batteryclose to even more than70%6Customer consultation,customer Complaints.Learn about the power supply businessservicecontent and handling business categories is to improve service effectivenessrate,Improve service level prerequisites.current,Business Hallhandles business with the following categories:

A.Tohandle electricity or advisory services,This is a dailyOne of the most measured businesses.customer service in its own business"Surround"strictly follow workflow,with meticulous serviceservice attitude and affinity language,generally allow customers

Ytwo think.

B.Thebusiness handled by cannot be completed independently of this post,requiresthe coordinates with other related departments to resolve the.Business increaseCustomer wait time,often single business request cannot be immediatelyprocess complete,takesseveral times to resolve,need to explain to customerwait reason,keep customer

contact and say to customer in time Clear Business progress, Establish necessary business process tracking system.

c. The is required to report to the Department for exceeding the scope of this position. approve in dealing with this type of business customer description permission and job Responsibility, and tell the customer that the client has the right to handle this business branch office and led information, to accompany customer to leader when necessary request.

d. customer's business request is fully working with itself duty violates, must have negative attitude to such request. Ignore this type of business, often most need to embody the art of service level, because any minor negligence at this time can cause the Customer dissatisfaction, so that The image of the Business Hall Civilization window is affected by damage. should try to avoid negative language, like cannot,

does not, Unwilling to, cannot be, and so on, these words cause negative feelings for customers, Think you're down. The correct way is to tell the customer what you can do, And very willing to help them; When the customer's request is not met, to tell For him, ask him to understand, and try to give reasonable suggestions, Let the customer accept.

distinguishes between the four different business types, is tricky Select the focus of business when dealing with, not only shorten single Business Processing time, increasing business throughput, to improve service quality, Building service culture, To Create a comprehensive effect humanized service.

(3) run with liquid fuel: use natural gas as a combustion To limit the application of the SOFC to the area near the gas supply network field, Limiting the application of this new technology. cause This exists let SOFC the pressing requirement for to use liquid fuel. because this, 库 cooperates with large oil companies on this subject nonporous development, Select a suitable liquid fuel and design the most appropriate on the use of this new fuel SOFC power plant, to Edge far User Service.

(4) CO₂ Separation: Shell Company and Siemens Westinghouse companies are working together to develop a ""₂ Detach from the fuel in full response from SOFC set Fly scheme. example [], when installed on the platform used to recycle oil, can (3) 2 Press the Ying to the underground reservoir, This will not only be omitted CO₂ Emissions Tax, can also increase the output of crude oil.

2. do a good job communicating with customers

Communication is divided into customer communication and system internal ditch

Pass.

communication with customers the purpose is to handle the accurately through communication Customer Requirements, better meet customer satisfaction. communication to in the power supply business Hall staff is a communication of the heart, communicate with customers calmly, Sensible, speak nonporous policy. Customer Service staff should be patient and listen to customer's comments, humbly accept criticism, sincerely thank customers for their suggestions, To do Chance, Wuzegamin. If the self work is lost false, should apologize to the customer immediately, if aggrieved, should be handled calmly, not sentimental, do not contradict and reprimand the guest user, More unable to quarrel with customer. for questions that are not in doubt questions do not bypass, no deny, No haste to conclude, in time to leader reporting to reply to customer.

communication within the system can also be understood as a management skill for people To. as a manager, mainly to transfer employee's product polarity and initiative, The staff of the business hall are more appropriate handle relationships with this department or other related department, to fight Their work in conjunction with, establishing tacit understanding at work, from Building harmonious relationships in enterprise.

3. improve business Skills for window people

skilled business capabilities require continuous learning, understand the power Force industry new trends, Learn advanced management methods to use business knowledge; You must communicate with colleagues frequently. cuo, working together. This requires a little bit of a drop. cumulative as the complexity of the business increases, Cumulative requirements The time you want for also increases accordingly. Therefore, it is recommended that the power supply business is large Staff can actively take the initiative by learning and communicating High-individual business capabilities.

four, closing

business lobby as the power Supply Company's window, plays the bridge effect of customer business and power supply Company Services. Business Large office staff in daily work, both by regulation, Speaking principle office Events, going through active service, Effective communication, Implementing Customer Satisfaction maximization. so, power supply Business Hall service not only is a work, is also a discipline, is an art.

(5) Comprehensive Application: CO₂ The separator may be ignition Spark device, It makes SOFC becomes a critical part in a closed and renewable Energy cycle of.. after a period of time between, SOFC to generate heat and power, For example, for large greenhouse facilities, SOFC Appliance-generated CO₂ can be used to speed Plant Growth. The remainder of any crop harvest Organic can be converted to gas supply SOFC as fuel.

Five, closing

on the verge of an energy crisis today, fuel cell as a New types of clean energy increasingly being taken seriously by governments, with the ongoing development of fuel cell technology, does not believe long Future, fuel cell will be widely used in our day normal life.

References

1. Wugen, Bai Limei, Yu., and so on. Status of biomass conversion energy technologies and trend discussion[J]. Environmental Science and management, 2008(1): 166-168.
2. weimin, Liu Tiancheng, Jiang Jianchun. Biomass energy conversion technologies and Applications(VID)[J]. Biological Chemical engineering, 2008, 3: 64-69.
3. Feng Wei. new countryside using biogas as a link to develop and utilize biomass resources[J]. Agricultural Mechanization nonporous, 2008(2): 204-206.
4. Chenhui, Lu Shanxiang, Biomass fuel ethanol[J]. Petroleum X, 2007 (2): 107-113.
5. Liu Junli, Jiang Jianchun. on the Biomass Energy standard system[J]. Biological Chemical engineering, 2007(2): 53-56.
6. Ma Huangang, Xu Hengyuan, Li Wenxian. Progress in the production of fuel ethanol from Lignocellulose[J]. Natural gas chemical, 2008(4): 60-64.
7. Nibei. Foreign fuel ethanol development dynamic[J]. Petro-tech, 2008(2): 9-11.
8. Zhang, Cao Yanzi, Li Zhibin. Fuel Ethanol Research overview and development prospects[J]. Lake Journal of South College of Technology, 2007(4): 89-91
9. du scenery, Schipping, Zhang Long., and so on. Fiber Quality^^ Fuel Ethanol industrialization research nonporous Progress[J]. China Hemp Science, 2007(1): 72-73.
10. Wudongmei, Li Yuning, Sun Yi. cellulose fermentation for the production of fuel ethanol Research nonporous[J]. Wine Technology, 2007(4): 116-120.
11. Li Zhijun, status of biofuel ethanol, Issues and policy recommendations[J]. Technology economy, 2008, 27 (6): 50-53.
12. hu. Biomass Fuel ethanol research nonporous Progress[J]. Sci-Tech innovation Herald, 2008: 114.
13. Sun Dozhi, Xu Qingli, through-reply., and so on. Wood Cellulose for fuel ethanol hydrolysis work Art Progress[J]. Henan X, 2008(4): 1-4.
14. Wang Xiaofei. status and development trend of biomass industry in China[J]. Power Device, 2008, 9 (7): 119-120.