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Preparation of gel polymer electrolyte and modification

CHEN Ai-yu, GAO Hong, YIN Yan-qun

(School of Environment and Chemistry Engineering, Shenyang Ligong University, Shenyang 110159, China)

Abstract: Gel polymer electrolyte in lithium secondary batteries exhibit superior performance, with great prospects for development. Reviews recent gel polymer electrolyte preparation and modification of the main means of research, which, in the preparation process introduces the physical cross linking method and chemical cross-linking method, modified means of complex inorganic materials and add organic plasticizers are commonly used means of modification. Preparation and modified gel polymer electrolyte focus of future research and development directions are put forward.

Key words: gel polymer electrolyte; preparation; modification means

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Based on Bayes Network of energy-saving residential investment decisions

WEI Cai-he, WANG En-mao

(School of Civil Engineering, Lanzhou Jiaotong University, Lanzhou 730070, China)

Abstract: In order to make the investors have a certain understanding for energy-saving residential investment risk levels and making a right investment choices or not, Bayes Network is introduced to study the energy-saving residential investment risk. Using the GeNIe 2.0 Bayes analysis software modeling, building energy-saving residential investment risk decision of Bayes Network model, the data analysis of model shows that investors are suitable for investment or not. When risk factors change, by the model's automatic updates features, update the entire network timely, thus more and all kinds of information will be accurately master. In the end, through a case to verify the effectiveness of the proposed model.

Key words: Bayes Network; energy-saving residential; investment decisions

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The effects of variable specific heats of working fluid on the performance of an endoreversible Lenoir cycle

ZHANG Zi-yu, CHEN Lin-gen, QIN Xiao-yong, et al

(Naval University of Engineering, Wuhan 430033, China)

Abstract: The performance of a Lenoir cycle is analyzed by using finite-time thermodynamics. The cycle model with variable specific

heats and heat transfer loss are established. The critical compression ratio, the relations between the work output and the compression ratio, between the efficiency and the compression ratio, as well as between work output and efficiency are derived by detailed numerical examples. Moreover, the effects of variable specific heats and heat transfer loss of working fluid on the cycle performance are analyzed. The results show that the effects of heat transfer loss and variable specific heats of working fluid on the cycle performance are obvious. The results obtained in this paper may provide some guidelines for the application of Lenoir cycle.

Key words: finite-time thermodynamics; endoreversible Lenoir cycle; variable specific heats; heat transfer loss

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Based on the LCA and CDM methodology for Carbon emission reduction from MSW incineration for power generation processes

YANG Wei-hua, CHU Jin-feng, WU Zhe, et al

(Institute of Urban Construction, HeBei University of Engineering, Handan 056038, China)

Abstract: Life-Cycle Assessment (LCA) and CDM methodology were applied to calculate Carbon emission reduction from MSW incineration for power generation project. And analyzed the suitability in China of the two kinds of calculation method by comparing the calculation results. It shows that the results of the Carbon emission reduction of the waste incineration power generation project is basically identical, which are calculating by the methods of LCA and CDM methodologies. The result of carbon emission reductions which calculated by CDM methodologies is slightly greater than the LCA's. Considering the applicability of the LCA method based data in China is low and the data is difficult to obtain, the calculation of our country's carbon emission reduction should be majored in CDM methodologies, LCA method can be used in conjunction with CDM methodologies so as to promote the perfection of our country accounting mechanism to reduce emissions.

Key words: MSW incineration for power generation; greenhouse gases; Life-Cycle Assessment; CDM methodology; Carbon emission reduction

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Design and simulation analysis of the system for comprehensive utilization of LNG cold energy

LV Yan-li, CHEN Gui-jun, XU Tie-jun

(School of Energy and Power Engineering, Dalian University of Technology, Dalian 116023, China)

Abstract: Liquefied Natural Gas (LNG) contains enormous cold energy. This part of cold energy usually is consumed by seawater or air in the evaporator, which causes huge energy waste. Based on thermodynamics theory, this paper made a process design and simulated the comprehensive utilization system of LNG cold energy with the software Aspen Plus to utilize energy reasonable. The simulation results show that with the principle of temperature counterparts and cascade utilization, the comprehensive utilization system which integrates the process of air separation, production of liquid carbon dioxide and drikold, cold storage and low temperature crushing, then match with LNG cold energy temperature, will extremely increase the utilization efficiency of LNG cold energy.

Key words: Liquefied Natural Gas (LNG); cold energy; comprehensive utilization; Aspen Plus; simulation calculation

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The optimization research of operational parameters of direct air-cooled units

LI Hui-jun, MA Ke-pan, LIU Xue-min

(School of Energy Power Mechanical Engineering, North China Electric Power University, Baoding 071003, China)

Abstract: Operational parameters having significant influences on heat economy of the units, it is quite meaningful to obtain the optimal values of operational parameters considering the effects of environmental factors for achieving energy saving. This study developed therefore an objective function of power supply efficiency related to operational parameters. Moreover, the optimum operating parameters were determined calculating the heat consumption of power plant and power consumption of fans taking NZK600-24. 2/566/566 unit as an example. The results show that optimal initial pressure and exhaust pressure increase with the increase of unit load or ambient temperature. Ambient temperature would have greater influences on operational parameters when temperature is greater than 20℃. Power supply efficiency decreases with the increase of ambient temperature or wind speed under equivalent load. Consequently, this investigation can provide a guidance for economic operation of direct air-cooled units by obtaining the optimization of operational parameters.

Key words: operation parameters optimization; heat consumption; power consumption of fans; power supply efficiency; direct air-cooled unit

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Probe emission rate has the effects on the heat flow meter test precision analysis

ZHAO Qi-cheng

(College of Environment & Chemical Engineering, Dalian University, Dalian 116622, China)

Abstract: The thermal resistance heat flow meter probe testing, paste on the test surface emissivity of the surface emissivity and probe is different, they have different radiant heat to the environment, which affects test precision of the heat flow meter, through theoretical analysis and experimental research on the issue, and reliable methods and correction curve equation is proposed.

Key words: thermal resistance heat flux meter; sensor; test error

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Conclusions and analysis of typical problems of industrial boiler thermal efficiency test

SUN Jian

(Jiangsu Province Special Equipment Safety and Supervision Inspection Institute, Branch of Wuxi, Wuxi 214174, China)

Abstract: Based on the thermal efficiency simple test of industrial boilers, a research is promoted to discuss the typical affects of the result, from the directions of boiler design and test standards, including

the problems of design defects, operation stability, the experience value of incomplete combustion heat loss, the limitation of empirical formula of heat loss due to exhaust gas and the applicability of test standards. Suggestions are finally provided for the continuous work.

Key words: typical problems; operation stability; heat loss; vapor condensation; applicability

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Coal mine rock source heat pump applications and economic analysis

LI Hai-ying, ZHANG Guo-tong

(Hebei United University, Tangshan 063200, China)

Abstract: Rock source heat pump is the use of low-grade underground rock layers and rock layers regenerative thermal performance of a new type of heat pump systems, as a new technology, the country is still in the preliminary stages of development and utilization. The working principle of rock-source heat pump and heat energy use patterns were analyzed with engineering examples, the rock source heat pumps and central air conditioning, split air-conditioning, central heating boiler cooling (heating) analysis and comparison of economic performance, pointed out that the rock-source heat pump system is a good performance, viable and non-polluting heat pump technology.

Key words: rock source heat pump; heat utilization of coal mine; energy-saving; economic analysis

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Initial pressure optimization of thermal power units based on improved BP neural network

CHEN Lin-xiao, WANG Hui-JIE, YANG Xin-jian

(Key Lab of Condition Monitoring and Control for Power Plant Equipment (North China Electric Power University), Baoding 071003, China)

Abstract: Traditional thermodynamic calculation method is difficult to achieve an online prediction. Prior knowledge and theoretical analysis of heat rate associated parameters as the input layer of the BP neural network parameters; use grey correlation degree model to verify. Comparing the improved BP neural network with the standard BP neural network, it shows improved BP neural network convergence speed and error than the standard BP neural network. Use historical data of 600MW thermal power unit to establish the non-linear mapping of boundary parameters and heat rate through improved BP neural network. Finding out the optimal initial pressure within the feasible pressure range, drawing out the optimal initial pressure curve and providing guidance for operating personnel.

Key words: improved BP neural network; viable early pressure; optimal initial pressure; grey correlation degree model

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