Pulse self-heating technology battery

Overview

Battery self-heating technology has emerged as a promising approach to enhance the power supply capability of lithium-ion batteries at low temperatures. However, in existing studies, the design of the heater c. ••A high-frequency heater is developed with pulse width modulation, which. Replacing fuel vehicles with electric vehicles is significant for reducing emissions of environmentally harmful substances. It is estimated that electric vehicles. 2.1. Pulse self-heater topologyFig. 1 shows the scheme of the proposed self-heating system, which comprises a lithium-ion battery and a pulse self-heater. The internal impe. This section presents the proposed optimal heating strategy utilizing the high-frequency pulse self-heater. The framework of the pulse heating strategy is introduced, followed by the d. In this section, the effectiveness of the proposed heating strategy is evaluated through a series of experiments. Firstly, detail setup of the experimental platform is introduced. Seco.

Article Content

An Optimal Pulse Heating Strategy for Lithium-ion Battery ...

The driving performance of electric vehicles seriously degrades due to the deterioration of lithium-ion batteries at low temperatures. Preheating lithium-ion batteries can effectively improve the driving range of electric vehicles at subzero temperatures. In this paper, an optimal pulse heating strategy is proposed for low-temperature heating of lithiumion battery. Firstly, this paper ...

Experimental study on pulse self-heating of lithium-ion battery at ...

On the other hand, self-heating strategies such as pulse self-discharging and high-frequency sine-wave heater are all effective approaches to warm the battery cells at low temperatures [48, 49 ...

Investigation on the method of battery self-heating using motor pulse ...

Li J, Wu P, Zhang C, et al. Study and implementation of thermal management technology for the power batteries of electric vehicles. Automot Eng 2016; 38: 22–27. ... Qu Z, Jiang Z, Wang Q. Experimental study on pulse self–heating of lithium–ion battery at low temperature. Int J Heat Mass Transf 2019; 135: 696–705. Crossref. Google ...

BYD battery pulse self-heating technology | BitAuto

BYD battery pulse self-heating technology Source: Bitauto authorf9e95947 Jan 18, 2025 According to the search results, the core technology of BYD automobile''s brand includes DM technology, where the DM-i platform features a new dual-motor power system architecture, focusing on cost-effectiveness.

An Optimal Pulse Heating Strategy for Lithium-ion Batteries ...

To address this issue, a novel pulse heating method for Lithium-ion batteries based on full-bridge buck-boost converter is proposed in this paper. The current operation pattern is analyzed ...

Experimental study on pulse self–heating of lithium–ion battery at ...

A pulse internal self–heating strategy is proposed to achieve quick battery heating. An electric circuit is built to generate intermittently high current in the battery. ...

A rapid self-heating strategy of lithium-ion battery at low ...

Self-discharge heating can be realized by changing the internal structure or external circuit structure of LIBs. Wang et al. proposed an intercalation heating method in which a Ni terminal was connected to the negative terminal to construct a three-terminal self-heating battery. The results showed that the battery could be heated from − ...

An optimal self-heating strategy for lithium-ion batteries with pulse ...

In order to enhance the energy efficiency and reduce the heating time of batteries, an optimal self-heating strategy is introduced, utilizing a novel pulse width modulated ...

A rapid self-heating strategy of lithium-ion battery at low ...

Compared with continuous direct current self-heating, the battery can be heated up from À10 °C to 10 °C by pulse heating within 175 s while the direct current heating consumes 280 s with ...

Alternating Pulse Self-Heating Method for Series-Connected

Low-temperature heating (LTH) is crucial for improving battery performance in such conditions. In this study, we propose an alternating pulse-based LTH method for series-connected battery packs. This method utilizes short periods of high pulse current, followed by rest periods, to achieve fast heating while reducing the impact on lifespan.

An Optimal Pulse Heating Strategy for Lithium-ion Battery ...

In this paper, an optimal pulse heating strategy is proposed for low-temperature heating of lithiumion battery. Firstly, this paper establishes a coupling model to describe the electro-thermal-aging behavior of battery. Secondly, the heating time and capacity loss jointly form a multi-objective optimization problem with the current constraint.

The state of the art on preheating lithium-ion batteries in cold ...

A review of current automotive battery technology and future prospects. Proc. Inst. Mech. Eng. Part D J. Automob. Eng., 227 (2013), pp. 761-776. Crossref View in Scopus Google ... Experimental study on pulse self–heating of lithium–ion battery at low temperature. Int. J. Heat Mass Transf., 135 (2019), pp. 696-705. View PDF View article View ...

Experimental study on pulse self–heating of lithium–ion battery at ...

TL;DR: In this paper, the authors proposed a pulse self-heating strategy to enable quick and safe warming of lithium-ion battery at low temperature, which can heat up 18,650 commercial battery with a control circuit and alleviate battery degradation during heating.

Experimental study on pulse self-heating of lithium-ion battery at ...

In this study, the pulse self-heating strategy is proposed to enable quick and safe warming of lithium-ion battery at low temperature. The battery is heated up using pulse self-discharge. This strategy can heat up 18,650 commercial battery with a control circuit and alleviate the battery degradation during heating.

A Pulse Heating Method without Capacity Reduction for Lithium ...

A heating method for lithium-ion battery is studied based on a simplified first principle electrochemical model. The criterion for avoiding lithium deposition is converted into current constraints under different temperature and state of charge. An experimental platform with closed-loop pulse current control function is built, by using of which, the effectiveness of the heating ...

An optimal self-heating strategy for lithium-ion batteries with pulse ...

Battery self-heating technology has emerged as a promising approach to enhance the power supply capability of lithium-ion batteries at low temperatures. However, in existing studies, the design of the heater circuit and the heating algorithm are typically considered separately, which compromises the heating performance.

Experimental study on self-heating strategy of lithium-ion battery ...

Preheating is an effective solution to the severe degradation of lithium-ion battery (LIB) performance at low temperatures. In this study, a bidirectional pulse-current preheating strategy for LIBs at low temperatures without external power is proposed, which involves the incorporation of a direct current/direct current converter and a series of ...

Experimental study on pulse self–heating of lithium–ion battery at ...

To acquire the temperature and voltage variation of the battery during self–heating, the pulse heating signal is applied to the battery. Heating is performed with the switching interval of 0.5 s. The initial ambient temperature is −10 °C, and heating is switched off when the battery reaches 10 °C. The SOC is set to 1. Fig. 3(a) shows the ...

Self-powered heating strategy for lithium-ion battery pack applied ...

Compared with continuous direct current self-heating, the battery can be heated up from À10 °C to 10 °C by pulse heating within 175 s while the direct current heating consumes 280 s with ...

Pulse self-heating strategy for low-temperature batteries based on ...

The experimental results showed that the proposed battery self-heating strategy can heat a battery from about -20 to 5 °C in less than 600 s without having a large ...

Fast self-preheating system and energy conversion model for ...

Experimental study on pulse self–heating of lithium–ion battery at low temperature. Int. J. Heat Mass Tran., 135 (2019), pp. 696-705. View PDF View article View in Scopus Google Scholar ... 2018 2nd International Conference on Power, Energy and Environment: towards Smart Technology (ICEPE) (2018), pp. 1-9. Google Scholar B. ...

An optimized internal heating strategy based on bidirectional ...

The low-temperature characteristics of lithium-ion batteries limit the performance of electric vehicles in cold weather, and the internal heating of lithium-ion batteries is a promising method. Unlike the existing constant-amplitude AC heating method, this paper proposes an optimized two-way pulse battery internal heating method based on a genetic algorithm. First, perform an EIS ...

A rapid self-heating battery pack achieved by novel driving ...

Heating the battery through its voltage polarization is a promising method to meet the requirements of battery heating .Researchers have found that the battery polarization under the pulse currents can rapidly heat the Li-ion cells homogeneously without damages .However, how to implement pulse currents on battery packs of EV is challenged.

BYD battery heating | BitAuto

BYD''s newly launched battery heating technology is "Battery Pack Pulse Self-heating," which generate. Home Wiki BYD battery heating. BYD battery heating. Source: Bitauto authorf1c80a50 Nov 21, 2024.

Pulse self-heating strategy for low-temperature batteries based on ...

(VACV) pulse self-heating strategy is proposed. The three primary contributions of this paper are listed as follows. 1. The inuences of dierent pulse current excitations on battery heating are investigated, including current waveform, amplitude, frequency, RMS, and duty cycle. 2. An online VACV pulse self-heating strategy is pro-

Self-powered heating strategy for lithium-ion battery pack applied ...

The battery self-powered heating circuit in Fig. 2 is developed to support heating control. The heating power of battery pack can be controlled precisely by restricting the output power of the DC/DC converter. ... Experimental study on pulse self–heating of lithium–ion battery at low temperature. Int J Heat Mass Tran, 135 (2019), pp. 696 ...

An Internal Heating Strategy for Lithium-Ion Batteries Without ...

AC pulse heating is a promising preheating method for lithium-ion batteries due to its low energy cost and high efficiency. To avoid the lithium plating in the AC heating, upper bound of heating current (UBHC) should be obtained. In this paper, the dual RC model is developed, and coupled with the thermal model to predict the battery temperature and potential ...

Distribution of relaxation times-based analysis of aging ...

The paper is structured as follows: Section 2 presents a comprehensive overview of the experimental design; Section 3 is divided into three subsections: Section 3.1 outlines the influence of AC parameters on temperature rise for self-heating, Section 3.2 delves into the battery aging mechanism employing the DRT method, and Section 3.3 establishes a ...

Experimental study on pulse self–heating of lithium–ion battery at ...

DOI: 10.1016/J.IJHEATMASSTRANSFER.2019.02.020 Corpus ID: 127709540; Experimental study on pulse self–heating of lithium–ion battery at low temperature @article{Qu2019ExperimentalSO, title={Experimental study on pulse self–heating of lithium–ion battery at low temperature}, author={Zhiguo Qu and Z. Y. Jiang and Qiuwan Wang}, ...

Pulse self-heating strategy for low-temperature batteries based on ...

(VACV) pulse self-heating strategy is proposed. The three primary contributions of this paper are listed as follows. 1. The inuences of dierent pulse current excitations on battery heating are ...

Research Progress on Pulse Heating Technology of Lithium-ion Battery ...

With the advantages of fast heating rate, good temperature uniformity and simple system structure, the battery pulse heating technology is an effective method to solve the problem of low temperature application of the lithium-ion batteries. In this paper, the research progress of pulse heating technology is summarized from the three ...

Fast self-heating battery with anti-aging awareness for freezing ...

Fast self-heating battery with anti-aging awareness for freezing climates application. ... Experimental study on pulse self–heating of lithium–ion battery at low temperature. Int J Heat Mass Transf (2019) ... This concept, which combines aspects of the Internet-of-Things (IoT) with the latest advancements in battery technology and cloud ...

BYD Han/Tang DM-i PHEV 18.3kwh 384v Self-heating technology ...

BYD gives a new definition of DM-i super hybrid special power blade battery: the world''s first power battery equipped with pulse self-heating technology. Thi...

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