Pei Shanshan Capacitor Scientific Modeling

How do we model the specific capacitance of supercapacitors?

We compiled a database by looking at over 100 research articlesto model the specific capacitance of supercapacitors. The specific capacitance can be influenced by physiochemical characteristics such as specific surface area,pore size,I D /I G ratio,voltage window,nitrogen,and atomic oxygen percentages.

Which ANN model is best for specific capacitance of carbon-based materials?

ANN models were developed for the specific capacitance of carbon-based materials. The best architecture was 6-11-11-11-1with 0.9 MT,0.5 LR,and 10,000 iterations. A GUI was created based on the synaptic weights of the ANN model. Quantitatively estimated the input variable's impact on specific capacitance.

Can ANN model predict specific capacitance?

The model predictions (adj.R $2 = 0.99$) and estimation of the isolated effect of independent variables,such as voltage window,cannot be varied independently in practice. The results from the ANN model were consistent with the existing theory and reasonable in estimating the specific capacitance beyond the scope of the experimental data.

How do we estimate the specific capacitance of carbon-based supercapacitors?

Acquiring a comprehensive evaluation methodis crucial to estimate the specific capacitance of carbon-based supercapacitors accurately. The ANN models use learning algorithms on specified data to characterize the complicated relationship between dependent and independent variables.

What is a discrete-time state-space model based on capacitor and inductor?

This paper proposes a novel discrete-time state-space model based on characteristics of capacitor and inductor, which aims to improve the speed and accuracy of real-time simulation in power systems. In the proposed method, the characteristic equations of capacitor and inductor are firstly discretized by numerical integration methods.

What is the relation between capacitance (C) and SSA (a)?

The relation of capacitance (C) and SSA (A) can be described by C=?? 0 A/d(? is the electrolyte dielectric constant,? 0 is the vacuum permittivity,and d the distance between the center of the ion and the carbon surface) ,. It is necessary to increase the SSA in order to enhance the capacitance (Fig. 1 a).

1.5????????????2??????1???????????????????????????????????,?????????????,???????????????????.????,1.5????????????? ??????,????????????,??????????(?? ...

My Postdoc research focuses on two topics: A) Pathways that maintain leukemic stem cells (LSC); B) Leukemic clonal evolution during therapeutic treatments. My ultimate goal is to ...

Pei Shanshan Capacitor Scientific Modeling

Carbon is the most widely used electrode for the supercapacitors. This work applies the artificial neural network (ANN) technology to predict the capacitance of carbon-based supercapacitors. For training the ANN model, we extracted data from hundreds of ...

The potential engineering applications of SCs are being continually explored. This paper presents a review of SC modeling, state estimation, and industrial applications reported in the literature, with the overarching goal to summarize recent research progress and stimulate innovative thoughts for SC control/management. For SC modeling, the ...

Pei-Zhen Zhang"s 27 research works with 2,210 citations and 5,932 reads, including: Eocene-Miocene tectonic reworking of the southeastern Tibetan Plateau: Geochronological and geochemical ...

One common technique for modeling the dynamic operation of SCs is through an electrical circuit model (ECM). This article presents a new approach to identifying ECM parameters by applying subspace system identification (SSID) algorithms and incorporating coulombic efficiency.

Carbon is the most widely used electrode for the supercapacitors. This work applies the artificial neural network (ANN) technology to predict the capacitance of carbon ...

Pei Shanshan"s 4 research works with 3 citations and 43 reads, including: An Evaluation System Based on User Big Data Management and Artificial Intelligence for Automatic...

This paper describes the creation of an ANN model to interpret how voltage window (V), I_D/I_G, N/O-dopings (at. %), pore size (nm), and specific surface area (m^2/g) parameters influence the specific capacitance (F/g). The experimentation has been carried out with several ANN architectures to achieve the best fit between the inputs and output.

In this work, we present the design and fabrication process of an ultra-thin capacitor model, the "planar accordion capacitor." This capacitor, which meets the requirements of various fields, was developed at the Plasma and Energy Conversion Laboratory (LAPLACE) of the University Paul Sabatier-France. We used the interesting properties of embedded ...

This paper describes the creation of an ANN model to interpret how voltage window (V), I_D/I_G, N/O-dopings (at. %), pore size (nm), and specific surface area (m^2/g) ...

Given the high interest in system modeling and a large number of papers published on this topic, modeling

techniques are classified, explained, and compared, addressing their strengths and weaknesses, and the experimental techniques used to measure the modeled properties are described.

A physics-based fractional-order Maxwell resistive capacitor (FOMRC) model is proposed to characterize nonlinear hysteresis and creep behaviors of a piezoelectric actuator (PEA). The Maxwell resistive capacitor (MRC) model is interpreted physically in the electric domain for PEAs. Based on this interpretation, the MRC model is modified to directly describe ...

Based on current research progress, this paper proposes a novel discrete-time state-space model based on characteristics of capacitor and inductor (DSMCCI). In order to further enhance the accuracy and speed of real-time simulation in power system, the DSMCCI optimizes the discretization process of state-space differential equations and ...

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