

Are vanadium oxides a good choice for energy saving devices?

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<div class="df\_qntext">Can vanadium oxide deposited by ALD act as a hole-selective contact?

This work reports the results of vanadium oxide ( $V_2O_5$ ) films deposited by ALD acting as a hole-selective contact for n-type crystalline silicon (c-Si) solar cell frontal transparent contact without the additional PECVD passivating layer. A reasonable specific contact resistance of  $100 \text{ m}^2 \text{ cm}^{-2}$  was measured by the transfer length method.

<div class="df\_qntext">Can ALD deposited vanadium oxide reach high-efficiency solar cells?

From photovoltaic results summarized in Table 1, one can see that the vanadium oxide deposited by ALD can reach significantly high-efficiency solar cells even without the use of an additional interlayer in contrast to other reported works, where a thin interlayer of a-Si:H (i) is required to passivate the surface of c-Si. 30

<div class="df\_qntext">Are vanadium oxides a good choice for energy saving devices?

Conclusions and Future Outlook In the past two decades, there has been accelerated development of vanadium oxides due to the fact that they are the most promising candidates in versatile applications, such as batteries, energy saving smart windows, sensing, catalysts, optoelectronic devices, etc.

<div class="df\_qntext">What is a vanadium oxide?

Vanadium oxides have a long history and rapid development in recent years as they are one of the most promising candidates in versatile applications in batteries, energy-saving smart windows, sensors, catalysts, optoelectronic devices, and so on. Therefore, many research papers and reviews have been published.

<div class="df\_qntext">Can vanadium oxide materials be used in ion batteries?

For the past 30 years, significant efforts have been made to study the fundamental science and explore the potential for vanadium oxide materials in ion batteries, water splitting, smart windows, supercapacitors, sensors, and so on.

<div class="df\_qntext">What are 2D vanadium oxides used for?

Owing to the atomic-scale thickness of single layers, the 2D materials exhibit tunable electrical properties and bandgaps. Therefore, the 2D vanadium oxides may hold promise for a wide range of applications in low-power electronics, flexible electronics, optoelectronics, catalysis, batteries, and so on.

A unit of Largo Resources is launching a new vanadium redox flow battery for utility-scale storage projects, microgrids, renewable energy ...

Because it is simple to synthesize from inexpensive materials and has a high specific capacity, vanadium oxide is a promising material that is gaining traction in the sphere of contemporary ...

Vanadium pentoxide ( $V_2O_5$ ) is more stable at high temperatures and has a greater energy density than other vanadium oxide phases. Its ability to undergo multiple redox processes ( $V \dots$

Recent advance in phase transition of vanadium oxide based solar reflectors and the fabrication progress  
Recent advance in phase transition of vanadium oxide based solar reflectors and the ...

This review contains references from journals, proceedings volumes, and patents involving the preparation, characterization, reactivity, and battery applications of materials containing ...

In-Situ Hydrogenation Strategies on Vanadium Oxide Hole-Selective Contact for Efficiency Crystalline Silicon Solar Cells Small ( IF 12.1 ) Pub Date : 2025-02-12, DOI: 10.1002/sml.202410492

Vanadium dioxide ( $VO_2$ ), a prospect intelligent heat-controlling materials, could be extensively applied in construction and automobiles as smart window coating for energy saving. ...

Indeed, vanadium oxide based materials are also able to convert solar energy for the production of hydrogen. To resume, binary and ternary vanadium oxides are ...

Graphical Abstract Similar content being viewed by others Improvement of photocatalytic degradation of organic dyes by vanadium doped titanium oxide nanoparticles using ...

Vanadium chemicals, known as the "vitamins of the modern industry," are major resources widely used in the petroleum, steel, batteries and catalyst industry. Vanadium is also ...

The efficiency of CIGSe thin film solar cells is slightly enhanced by absorbing more photons when the CIGSe thickness increases from 1 to 6  $\mu\text{m}$ . The variation of CIGSe bandgap affects ...

**ABSTRACT** The potential of thermal evaporation-grown vanadium pentoxide ( $V_2O_5$ ) as a passivating-carrier selective contact material for high-performance heterojunction crystalline silicon solar cells ...

This review article will discuss the synthesis methods, structural characterization techniques, and applications of vanadium oxide-based materials. We will also highlight the recent ...

In this work, we prepared vanadium oxide ( $V_2O_5$ -X) films using low-cost solution method as the hole-selective transport layer for silicon heterojunction solar cells. The low temperature ...

Issue 48, 2018 Previous Article Next Article From the journal: Chemical Communications Highly-efficient

and low-temperature perovskite solar ...

Vanadium suboxide ( $V_2O_x$ ) has been suggested as a promising transition metal oxide for the development of selective contacts on high-performance crystalline silicon heterojunction solar ...

With effective charge carrier extraction and minimal recombination losses enabled by these characteristics,  $V_2O_5$  is a promising material for use as a carrier selective contact (CSC) in ...

Vanadium oxides with multioxidation states and various crystalline structures offer unique electrical, optical, optoelectronic and magnetic properties, which could be manipulated for various applications. ...

Herein, an in-situ hydrogen plasma treatment (HPT) process is employed to modulate the photoelectric properties of vanadium oxide ( $V_2O_x$ ) film as well as the c-Si/ $V_2O_x$  interface.

Recent advances in the development of nanostructured vanadium oxides and their applications are summarized. This review includes synthesis ...

The current study aims to evaluate the potential of Vanadium (V) oxide-reinforced calcium-borate glass for nuclear resource management, specifically in the context of container design ...

The formed vanadium pentoxide solution was mixed into the molybdenum oxide precursor with different molar ratios (1%, 3%, 5%, 7%, 10%). Finally, the resulting solution was ...

Abstract Vanadium dioxide, which has been demonstrated as negative differential thermal emissivity materials for emissivity engineering application, is regarded as the most important ...

However, the present article specifically focuses on the application of vanadium-based chalcogenides in solar cells, as they have shown high electrical conductivity, desirable catalytic ...

Calculations show that the  $Si_3N_4$  layer provides the much desired linear performance of the  $VO_x$ -based bolometer. Applications of vanadium oxides have been summarized. Examples of ...

The electrochemical properties of metal oxides are very attractive and fascinating in general, making them a potential candidate for supercapacitor application. Vanadium oxide is of ...

Atomic layer deposition (ALD) is a method of choice for the growth of highly conformal thin films with accurately controlled thickness on planar and nanostructured surfaces. These ...

Abstract The hydrothermal synthesis of monoclinic-phase vanadium dioxide ( $VO_2(M)$ ) has been extensively studied for applications in energy-saving smart windows. In the majority of ...

(Note: you will need to create a separate account there.) Vanadium Pentoxide and Bismuth Oxide Thin Films Deposition on PSi for Application in Solar Cells Silicon ( IF2.8 ) Pub Date : 2025-01-16, DOI: ...

In the search for an alternative to expensive silicon solar cells, transition metal chalcogenides (TMCs) are emerging as promising new semiconducting materials for photovoltaic applications. Among all ...

In this work, we studied the vanadium oxide thin films deposited by ALD and studied their application as a hole transport layer in crystalline silicon solar cells ...

To improve the performance of perovskite solar cells (PSCs), vanadium oxide (VO<sub>x</sub>) film was deposited as an interface modification layer (IML) by a rad...

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