Thin-film solar cells and lithium batteries

What is a thin-film lithium battery?
The batteries,which are less than 15 um thick,have important applications in a variety of consumer and medical products,and they are useful research tools in characterizing the properties of lithium intercalation compounds in thin-film form.

Are thin-film lithium-ion batteries stable at 260°C?
Responding to the need for thin-film batteries that can tolerate heating to 250-260°C so they can be integrated into circuits using the solder reflow process,we have synthesized several inorganic anode materials ,that result in thin-film lithium-ion cells which are stableat these temperatures.

Are all-solid-state thin-film lithium batteries good for microelectronics?
All-solid-state thin-film lithium batteries (TFBs) with high voltage are crucialfor powering microelectronics systems. However,the issues of interfacial instability and poor solid contact of cath...

What is the patent number for a thin film battery?
Bates,J. B.; Dudney,N. J.; Gruzalski,G. R.; Luck,C. F. Thin Film Battery And Method For Making Same. U.S. Patent US 5,338,6,Aug 16,1994. Bhardwaj,R. C. Charging techniques for solid-state batteries in portable electronic devices. U.S. Patent US 9,553,4,Jan 24,2017. DigiKey.

How do anodeless solid-state lithium thin-film batteries (TFBS) maximize Ved?
To maximize the VED,anodeless solid-state lithium thin-film batteries (TFBs) fabricated by using a roll-to-roll processon an ultrathin stainless-steel substrate (10-75 um in thickness) have been developed. A high-device-density dry-process patterning flow defines customizable battery device dimensions while generating negligible waste.

What is the areal capacity of LCO thin-film cathode?
The highest areal capacity from the LCO thin-film cathode is ~0.69 mAh/cm 2in theory when 10-um-thick LCO is used. In practical cells the cathode utilization is around 80-95%,which corresponds to an areal capacity of 0.55-0.66 mAh/cm 2. The capacity retention reaches approximately 95% after 150 cycles.

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To meet the miniature requirement of modern electronics, some nanodevices have also developed for inorganic solar cells. Lieber and co-workers [33], [34] fabricated single p-type/intrinsic/n-type (p-i-n) coaxial silicon nanowire solar cells that mainly consisted of a p-type silicon nanowire core, intrinsic polycrystalline

silicon layer and n-type polycrystalline silicon ...

Use of triple-junction solar cell with stacks of thin-film silicon solar cells (a-Si:H/a-Si:H/uc-Si:H) to charge an Li 4 Ti 5 O 12 /LiFePO 4 LIB was investigated by Agbo et al. 4 The triple-junction solar cell had a short-circuit current density (J SC) of 2.0 mA cm -2 and open-circuit voltage (V OC) of 2.09 V under attenuated illumination of 37.4 mW cm -2, which ...

This device combines a thin-film lithium polymer battery with a thin-film solar ...

Lithium-sulfur (Li-S) system coupled with thin-film solid electrolyte as a novel high-energy micro-battery has enormous potential for complementing embedded energy harvesters to enable the autonomy of the Internet of Things microdevice.

All-Solid-State Thin-Film Lithium-Sulfur Batteries Renming Deng1, Bingyuan Ke1, Yonghui Xie1, Shoulin Cheng1, Congcong Zhang1, Hong Zhang1,2,3, Bingan Lu4 *, Xinghui Wang1,2,3 * HIGHLIGHTS o The all-solid-state thin-lm Li-S battery has been successfully developed by stacking VGs-Li 2 S cathode, lithium-phosphorous-oxynitride (LiPON) solid electrolyte, and Li ...

The purpose of this paper is to summarize the results of recent studies of lithium, lithium-ion, and lithium free thin-film cells with crystalline LiCoO 2 cathodes and to briefly describe some of the interesting properties of nano- and microcrystalline films in the lithium manganese oxide system. Published results and work in progress on the structure and ...

However, the state-of-the-art micro energy storage components, like all-solid-state thin-film microbatteries (ASSTFBs), whose direct integration is impeded by the stereotyped vacuum-based manufacturing technologies, for which an inevitable high-temperature annealing step (> 500 °C) can exert catastrophic effects on the attached ...

In particular, characterization techniques developed for lithium-ion batteries offer exciting opportunities for in situ and operando investigations of polymer-based batteries. Similar to other applications of polymers in organic electronics, for example, in solar cells or PLEDs, the stability of the organic compounds is extremely important ...

To demonstrate this we used triple-junction thin-film silicon solar cell connected directly to a lithium ion battery cell to charge the battery and in turn discharge the battery through the solar cell. Our results show that with appropriate voltage matching the solar cell provides efficient charging for lab-scale lithium ion storage cell.

All-solid-state thin-film lithium batteries (TFBs) with high voltage are crucial for powering microelectronics systems. However, the issues of interfacial instability and poor solid contact of cathode/electrolyte films have limited their application. In this work, the preferentially orientated LiCoO

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Lithium-sulfur (Li-S) system coupled with thin-film solid electrolyte as a novel high-energy micro-battery has enormous potential for complementing embedded energy harvesters to enable the autonomy of the Internet of Things microdevice. However, the volatility in high vacuum and intrinsic sluggish kinetics of S hinder researchers from empirically integrating ...

No, thin-film solar cells are not an ideal choice for residential use, primarily due to their lower efficiency, which ranges from 7-22%. The lower efficiency of thin-film solar cells means they are not as good at converting sunlight into electricity compared to more efficient types like monocrystalline or polycrystalline solar cells.

This work focuses on the potentials of monolithic integrated thin-film silicon solar cell and lithium ion cell in a simple cell-to-cell integration without any control electronics as a compact power solution for portable electronic devices. To demonstrate this we used triple-junction thin-film silicon solar cell connected directly to a lithium ion battery cell to charge the ...

In this work, we focus on the development of triple-junction thin-film silicon solar cells for monolithic integration with lithium ion storage cells. We show that with appropriate voltage matching a triple junction thin-film silicon solar cell provides efficient charging for lab-scale Li-ion storage cell under a range of illumination ...

The purpose of this paper is to summarize the results of recent studies of lithium, lithium-ion, and lithium free thin-film cells with crystalline LiCoO 2 cathodes and to briefly describe some of the interesting properties of nano- and microcrystalline films in the lithium manganese oxide system.

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