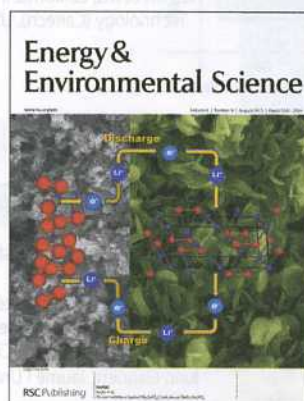


IN THIS ISSUE

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Cover
See Aurbach *et al.*, pp. 2265–2279. Image reproduced by permission of Doron Aurbach from *Energy Environ. Sci.*, 2013, **6**, 2265.



Inside cover
See Nazar *et al.*, pp. 2257–2264. Image reproduced by permission of Linda Nazar from *Energy Environ. Sci.*, 2013, **6**, 2257.

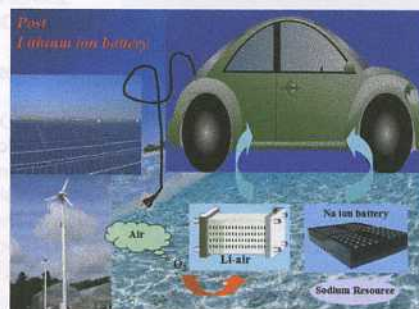
EDITORIAL

2256

New energy storage devices for post lithium-ion batteries

Haoshen Zhou

In this themed issue, recent research progress into post lithium-ion batteries is reviewed.



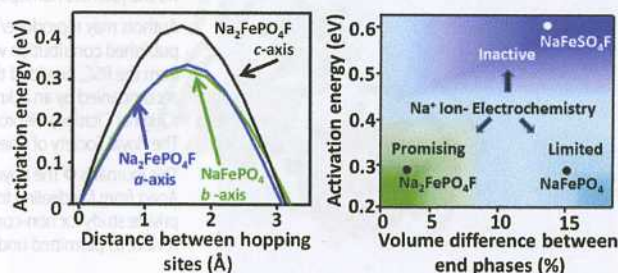
PAPER

2257

Na-ion mobility in layered $\text{Na}_2\text{FePO}_4\text{F}$ and olivine $\text{Na}[\text{Fe},\text{Mn}]\text{PO}_4$

R. Tripathi, S. M. Wood, M. S. Islam* and L. F. Nazar*

This atomistic modelling study presents insight into Na-ion transport and its correlation to reversible Na-ion intercalation in olivine $\text{Na}(\text{Fe},\text{Mn})\text{PO}_4$ and layered $\text{Na}_2\text{FePO}_4\text{F}$.

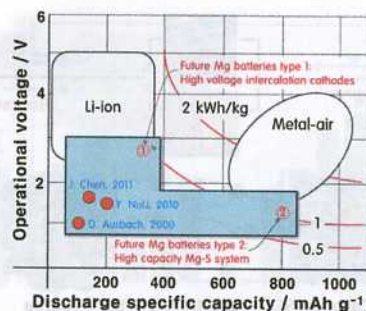


2265

Mg rechargeable batteries: an on-going challenge

Hyun Deog Yoo, Ivgeni Shterenberg, Yosef Gofer, Gregory Gershinsky, Nir Pour and Doron Aurbach*

Advances in Mg rechargeable battery science and technologies are updated and the key issues for the commercialization are addressed.



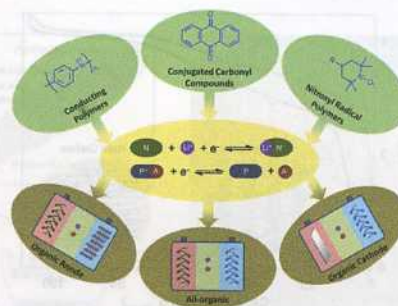
REVIEWS

2280

Towards sustainable and versatile energy storage devices: an overview of organic electrode materials

Zhiping Song* and Haoshen Zhou*

Electroactive organics are promising high performance electrode materials, towards cheap, green, sustainable and versatile energy storage devices beyond Li-ion batteries.

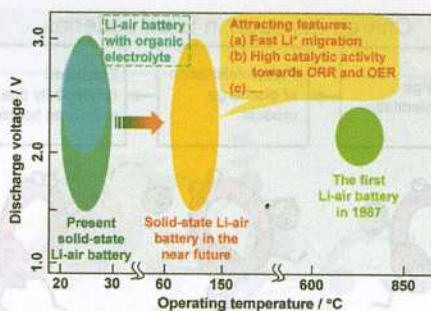


2302

The pursuit of rechargeable solid-state Li-air batteries

Fujun Li, Hirokazu Kitaura and Haoshen Zhou*

Solid-state Li-air (O_2) batteries are considered to be promising due to the stability of solid-state electrolytes. On the status, challenges, and perspectives of rechargeable solid-state Li-air (O_2) batteries a specific review is provided here.



2312

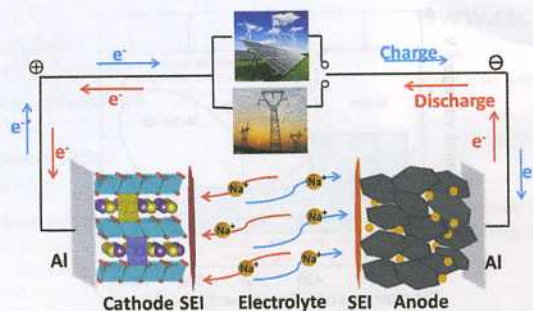
Update on Na-based battery materials. A growing research path

Verónica Palomares, Montse Casas-Cabanas, Elizabeth Castillo-Martínez, Man H. Han and Teófilo Rojo*

The growing efforts on low temperature Na-based energy storage systems are reviewed from a materials perspective.



2338



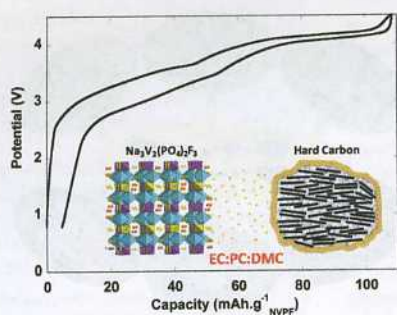
Room-temperature stationary sodium-ion batteries for large-scale electric energy storage

Huilin Pan, Yong-Sheng Hu* and Liquan Chen

This review discusses recent progress and our thoughts on the development of room-temperature "rocking chair" sodium-ion batteries particularly for large-scale electric energy storage.

PAPERS

2361



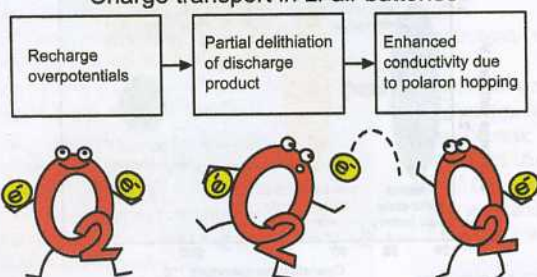
Towards high energy density sodium ion batteries through electrolyte optimization

Alexandre Ponrouch,* Rémi Dedryvère, Damien Monti, Atif E. Demet, Jean Marcel Ateba Mba, Laurence Croguennec, Christian Masquelier, Patrik Johansson and M. Rosa Palacín*

Na-ion cells with performance comparable to Li-ion cells were assembled with $\text{Na}_3\text{V}_2(\text{PO}_4)_2\text{F}_3$ and hard carbon electrodes in an $\text{EC}_{0.45}:\text{PC}_{0.45}:\text{DMC}_{0.1}$ electrolyte.

2370

Charge transport in Li-air batteries



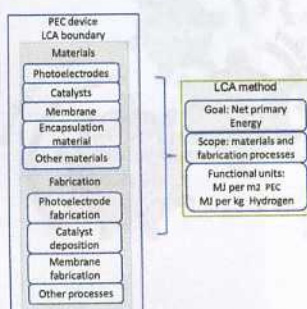
Charge transport in lithium peroxide: relevance for rechargeable metal-air batteries

Maxwell D. Radin and Donald J. Siegel*

First-principles calculations of the conductivity of Li_2O_2 indicate that sluggish charge transport may be a performance-limiting factor for Li-air batteries.

ANALYSIS

2380



Net primary energy balance of a solar-driven photoelectrochemical water-splitting device

Pei Zhai,* Sophia Haussener, Joel Ager, Roger Sathre, Karl Walczak, Jeffery Greenblatt and Thomas McKone

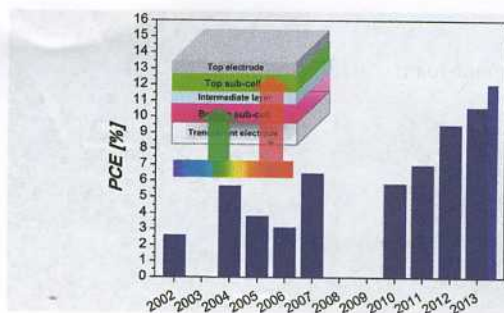
A fundamental requirement for a renewable energy generation technology is that it should produce more energy during its lifetime than is required to manufacture it.

2390

Highly efficient organic tandem solar cells: a follow up review

Tayebeh Ameri,* Ning Li and Christoph J. Brabec

In this article we follow up our previous work and review the most important developments that have been recently reported on organic tandem solar cells. In addition, some brief theoretical considerations addressing the potential of single and tandem solar cells, the working principles of the intermediate layer, the importance of optical simulations and finally the intricacies of a precise measurement of tandem devices based on complementary absorbers are presented.



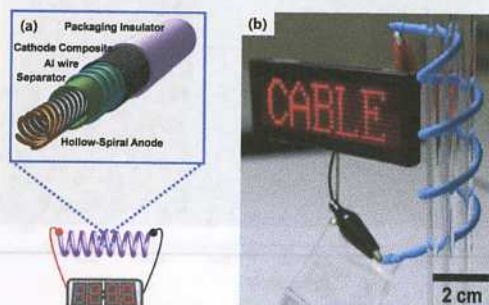
MINIREVIEW

2414

Progress in flexible energy storage and conversion systems, with a focus on cable-type lithium-ion batteries

Sang-Young Lee, Keun-Ho Choi, Woo-Sung Choi, Yo Han Kwon, Hye-Ran Jung, Heon-Cheol Shin* and Je Young Kim*

The unending demand for portable, flexible, and even wearable electronic devices that have an aesthetic appeal and unique functionality stimulates the development of advanced power sources that have excellent electrochemical performance and, more importantly, shape versatility.



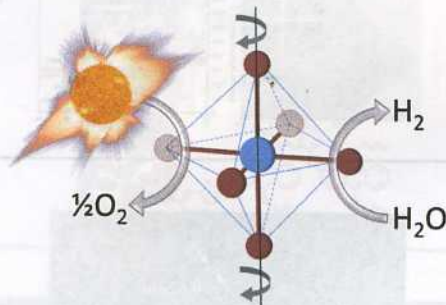
COMMUNICATIONS

2424

Sr- and Mn-doped $\text{LaAlO}_{3-\delta}$ for solar thermochemical H_2 and CO production

Anthony H. McDaniel,* Elizabeth C. Miller, Darwin Arifin, Andrea Ambrosini, Eric N. Coker, Ryan O'Hayre, William C. Chueh and Jianhua Tong*

Perovskite oxides may revolutionize water splitting chemistry via high-temperature, two-step thermochemical cycles powered by concentrating solar energy.

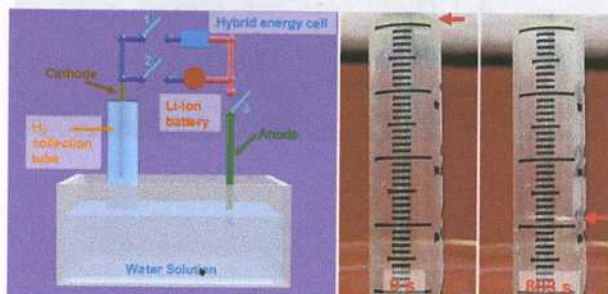


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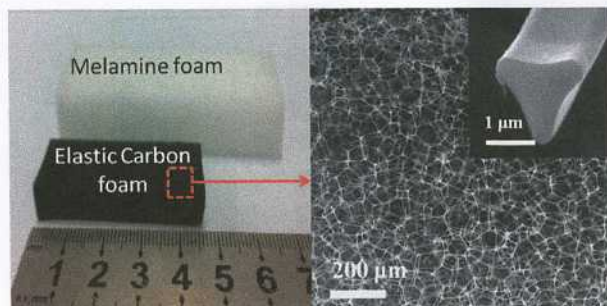
A hybrid energy cell for self-powered water splitting

Ya Yang, Hulin Zhang, Zong-Hong Lin, Yan Liu, Jun Chen, Ziyin Lin, Yu Sheng Zhou, Ching Ping Wong and Zhong Lin Wang*

The mechanical, thermal, and solar energies were harvested using a hybrid cell for self-powered water splitting.



2435

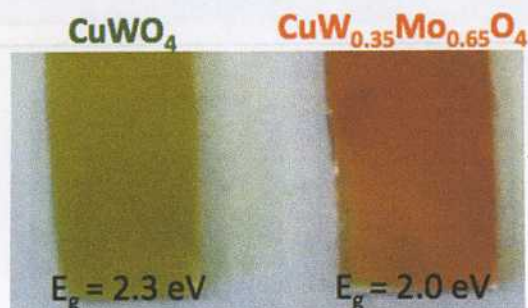


Elastic carbon foam via direct carbonization of polymer foam for flexible electrodes and organic chemical absorption

Shuiliang Chen,* Guanghua He, Huan Hu, Shaoqin Jin, Yan Zhou, Yunyun He, Shuijian He, Feng Zhao and Haoqing Hou*

A novel elastic carbon foam with a 3D interconnected network was prepared by the direct carbonization of melamine foam.

2440

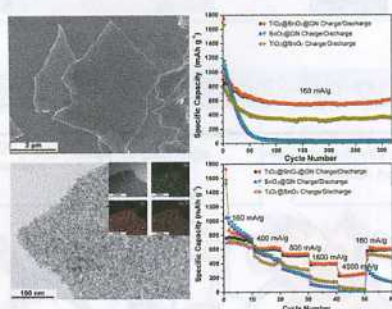


Synthesis, photoelectrochemical properties, and first principles study of n-type $\text{CuW}_{1-x}\text{Mo}_x\text{O}_4$ electrodes showing enhanced visible light absorption

James C. Hill, Yuan Ping, Giulia A. Galli* and Kyoung-Shin Choi*

A new electrochemical synthesis and first principles study of Mo-rich solid solutions of CuWO_4 and CuMoO_4 are reported, which exhibit significantly reduced bandgaps with respect to that of CuWO_4 .

2447

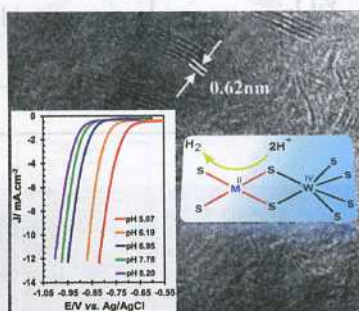


Highly reversible and ultra-fast lithium storage in mesoporous graphene-based $\text{TiO}_2/\text{SnO}_2$ hybrid nanosheets

Yanping Tang, Dongqing Wu, Si Chen, Fan Zhang,* Jinping Jia and Xinliang Feng*

Mesoporous graphene-based $\text{TiO}_2/\text{SnO}_2$ hybrid nanosheets with highly reversible and ultra-fast lithium storage are developed by a facile and scalable approach.

2452



Novel cobalt/nickel-tungsten-sulfide catalysts for electrocatalytic hydrogen generation from water

Phong D. Tran,* Sing Yang Chiam, Pablo P. Boix, Yi Ren, Stevin S. Pramana, Jennifer Fize, Vincent Artero* and James Barber*

A scalable electrodeposition process was developed for preparing single phase cobalt/nickel-tungsten-sulfides which are attractive alternatives to platinum for electrocatalytic reduction of protons.

