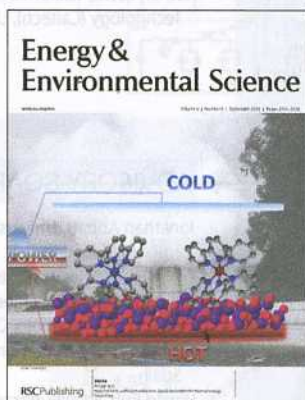


IN THIS ISSUE

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Cover
See Su *et al.*, pp. 2591–2596.
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See Pringle *et al.*, pp. 2639–2645.
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Energy Environ. Sci., 2013, **6**, 2639.

ANALYSIS

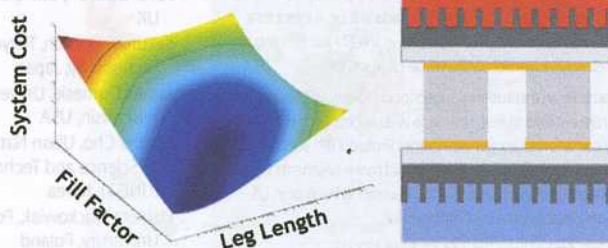
2561

\$ per W metrics for thermoelectric power generation: beyond ZT

Shannon K. Yee,* Saniya LeBlanc, Kenneth E. Goodson and Chris Dames*

Designing thermoelectric generators based on minimizing their \$ per W enables comparing this energy technology to others on a cost basis.

Thermoelectric \$/W

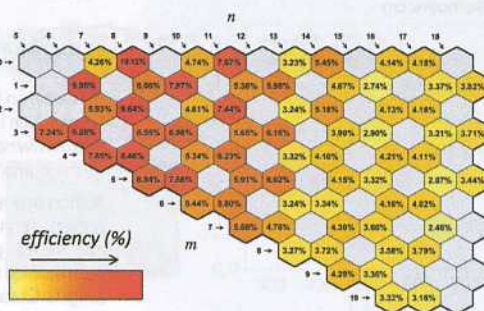


2572

The potential sunlight harvesting efficiency of carbon nanotube solar cells

Daniel David Tune* and Joseph George Shapter

An in-depth analysis of the sunlight harvesting potential of single walled carbon nanotube solar cells.

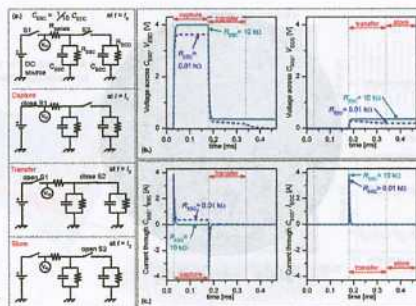


2578

Perspective: hybrid systems combining electrostatic and electrochemical nanostructures for ultrahigh power energy storage

Lauren C. Haspert, Eleanor Gillette, Sang Bok Lee* and Gary W. Rubloff*

Motivated by advanced nanostructures for energy storage, this perspective highlights the potential for ultra-high power hybrid electrochemical and electrostatic nanocapacitors.



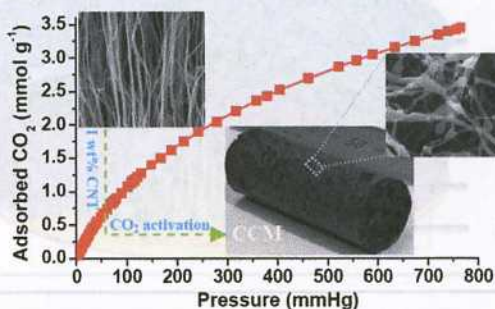
COMMUNICATIONS

2591

Carbon nanotube modified carbon composite monoliths as superior adsorbents for carbon dioxide capture

Yonggang Jin, Stephen C. Hawkins, Chi P. Huynh and Shi Su*

Incorporating a small proportion of carbon nanotubes significantly improves pore structures and CO₂ adsorption properties of carbon composite monoliths.

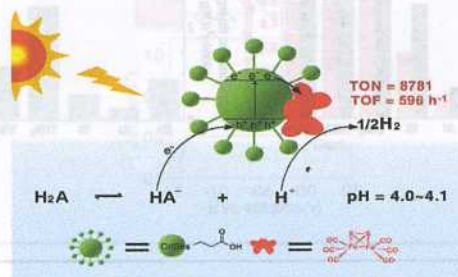


2597

Interface-directed assembly of a simple precursor of [FeFe]-H₂ase mimics on CdSe QDs for photosynthetic hydrogen evolution in water

Cheng-Bo Li, Zhi-Jun Li, Shan Yu, Ge-Xia Wang, Feng Wang, Qing-Yuan Meng, Bin Chen, Ke Feng, Chen-Ho Tung and Li-Zhu Wu*

An interface-directed approach is reported for construction of an artificial photocatalyst, CdSe/Fe₂S₂(CO)₆ assembly of [FeFe]-hydrogenase enzyme, for efficient photocatalytic hydrogen evolution in water.

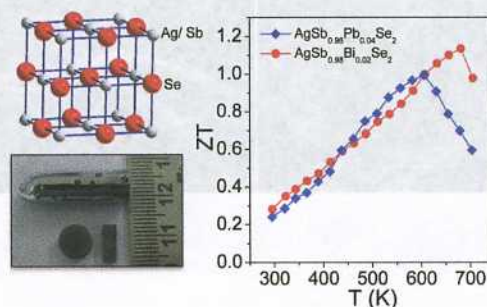


2603

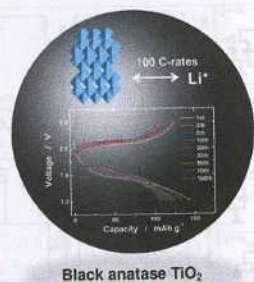
High thermoelectric performance in tellurium free p-type AgSbSe₂

Satya N. Guin, Arindom Chatterjee, Devendra Singh Negi, Ranjan Datta and Kanishka Biswas*

Enhanced electrical transport and ultra low thermal conductivity result in a high thermoelectric figure of merit in Pb or Bi doped AgSbSe₂, which is ~190% higher compared to that of the pristine sample.



2609

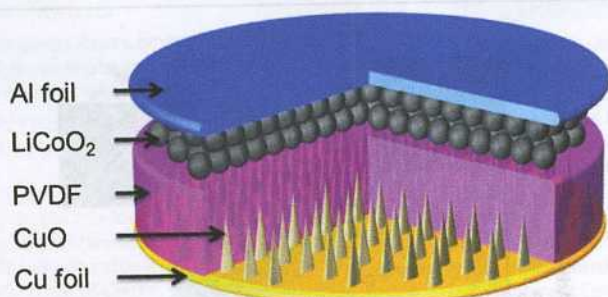
Black anatase TiO₂

Black anatase titania enabling ultra high cycling rates for rechargeable lithium batteries

Seung-Taek Myung,* Masaru Kikuchi, Chong Seung Yoon, Hitoshi Yashiro, Sun-Jae Kim, Yang-Kook Sun* and Bruno Scrosati*

Black anatase TiO₂ has a band gap energy as low as 1.8 eV, resulting in a very high electrical conductivity of $8 \times 10^{-2} \text{ S cm}^{-1}$. These extraordinary electro-conducting physical properties ensure an ultra fast Li⁺ insertion into and extraction from the host structure of anatase TiO₂ making it a unique, high rate electrode.

2615

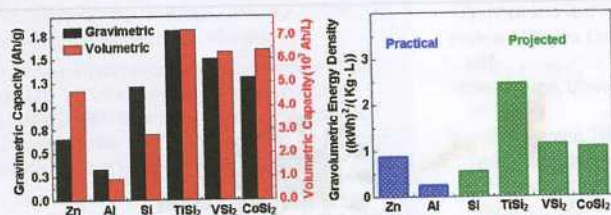


CuO/PVDF nanocomposite anode for a piezo-driven self-charging lithium battery

Xinyu Xue,* Ping Deng, Shuang Yuan, Yuxin Nie, Bin He, Lili Xing and Yan Zhang*

CuO/PVDF nanoarrays have been used as the piezo-anode of the integrated self-charging power cell, which can be efficiently and stably charged up by mechanical deformation.

2621

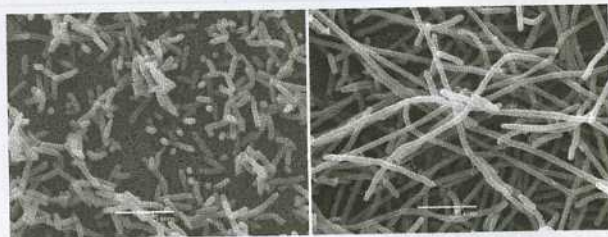


Very high energy density silicide-air primary batteries

Hua Zhang, Xing Zhong, Jonathan C. Shaw, Lixin Liu, Yu Huang* and Xiangfeng Duan*

A new family of silicide anodes is reported for metal-air batteries with unparalleled gravimetric or volumetric anode capacity.

2626



Cisplatin-induced elongation of *Shewanella oneidensis* MR-1 cells improves microbe-electrode interactions for use in microbial fuel cells

Sunil A. Patil,* Kamil Górecki, Cecilia Hägerhäll and Lo Gorton*

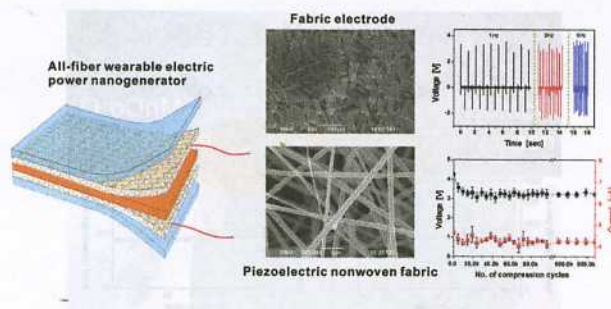
The elongated *Shewanella oneidensis* MR-1 cells (cisplatin-treated) showed up to a 5-fold improvement in current densities compared to normal, untreated cells.

2631

Highly durable all-fiber nanogenerator for mechanical energy harvesting

Wei Zeng, Xiao-Ming Tao,* Song Chen, Songmin Shang, Helen Lai Wah Chan and Siu Hong Choy

A novel all-fiber wearable electric power nanogenerator with piezoelectric nanofiber nonwoven fabric sandwiched with elastic fabric electrodes.

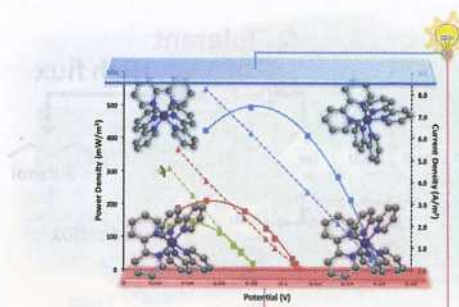


2639

High Seebeck coefficient redox ionic liquid electrolytes for thermal energy harvesting

Theodore J. Abraham, Douglas R. MacFarlane and Jennifer M. Pringle

The highest reported Seebeck coefficients and power outputs to-date for ionic liquid-based thermochemical cells utilising a high entropy change cobalt redox couple are reported.

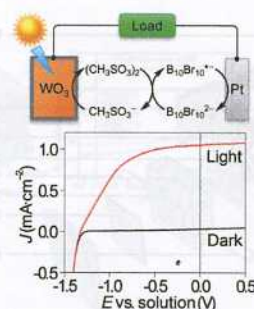


2646

Photoelectrochemical oxidation of anions by WO₃ in aqueous and nonaqueous electrolytes

Qixi Mi, Robert H. Coridan, Bruce S. Brunshwig, Harry B. Gray* and Nathan S. Lewis*

Nonaqueous photoelectrochemistry of WO₃ sheds light on the interfacial processes of semiconductor/electrolyte contacts, and helps produce a large open-circuit voltage in the presence of a high-potential redox couple.

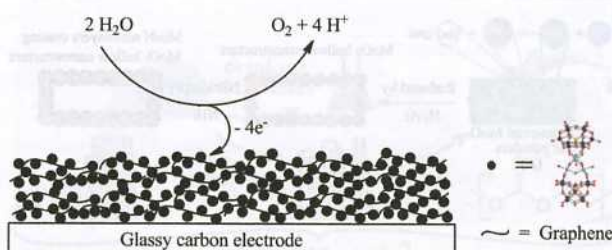


2654

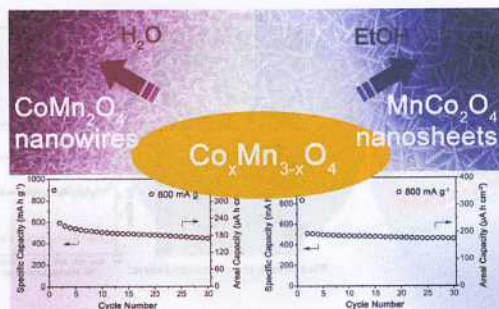
Graphene-supported $[\{\text{Ru}_4\text{O}_4(\text{OH})_2(\text{H}_2\text{O})_4\}(\gamma\text{-SiW}_{10}\text{O}_{36})_2]^{10-}$ for highly efficient electrocatalytic water oxidation

Si-Xuan Guo, Yuping Liu, Chong-Yong Lee, Alan M. Bond,* Jie Zhang,* Yurii V. Geletii and Craig L. Hill*

The molecular water oxidation catalyst, $[\{\text{Ru}_4\text{O}_4(\text{OH})_2(\text{H}_2\text{O})_4\}(\gamma\text{-SiW}_{10}\text{O}_{36})_2]^{10-}$ (**1**), can be immobilized on graphene in a stable configuration. This graphene supported **1** exhibits excellent electrocatalytic water oxidation activity.



2664

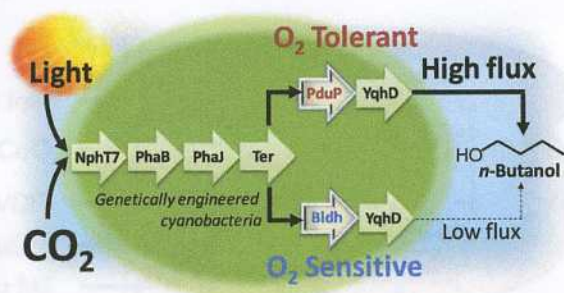


Controlled synthesis of hierarchical $\text{Co}_x\text{Mn}_{3-x}\text{O}_4$ array micro-/nanostructures with tunable morphology and composition as integrated electrodes for lithium-ion batteries

Le Yu, Lei Zhang, Hao Bin Wu, Genqiang Zhang and Xiong Wen (David) Lou*

Hierarchical $\text{Co}_x\text{Mn}_{3-x}\text{O}_4$ nanostructures with tunable morphology and composition directly grown on stainless steel foil exhibit interesting electrochemical lithium storage properties with high specific capacity and good cycle life.

2672

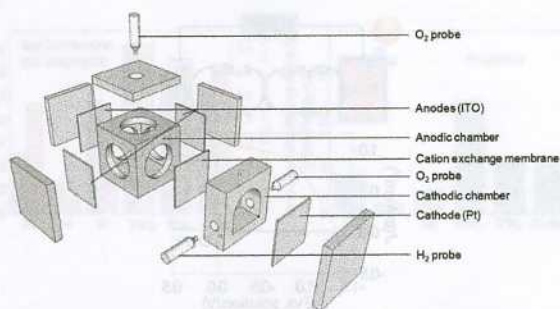


Oxygen-tolerant coenzyme A-acylating aldehyde dehydrogenase facilitates efficient photosynthetic *n*-butanol biosynthesis in cyanobacteria

Ethan I. Lan, Soo Y. Ro and James C. Liao*

A synthetically designed oxygen tolerant *n*-butanol biosynthesis pathway led to significant (20-fold) improvement of *n*-butanol production from CO_2 using engineered cyanobacteria.

2682

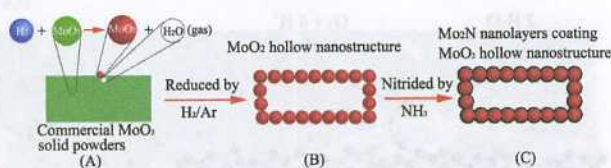


Hydrogen production through oxygenic photosynthesis using the cyanobacterium *Synechocystis* sp. PCC 6803 in a bio-photoelectrolysis cell (BPE) system

Alistair J. McCormick, Paolo Bombelli, David J. Lea-Smith, Robert W. Bradley, Amanda M. Scott, Adrian C. Fisher, Alison G. Smith and Christopher J. Howe*

In the current study we demonstrate the production of H_2 using cyanobacteria and light with a biophotoelectrolysis cell (BPE).

2691



Synthesis of Mo_2N nanolayer coated MoO_2 hollow nanostructures as high-performance anode materials for lithium-ion batteries

Jun Liu,* Shasha Tang, Yakun Lu, Gemei Cai,* Shuquan Liang,* Wenjun Wang and Xiaolong Chen*

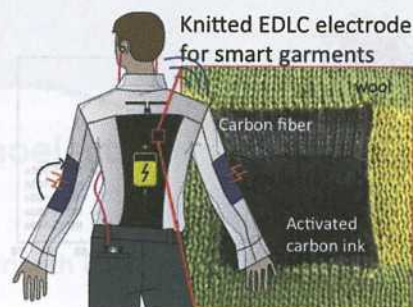
A simple and effective nitride-nanocoating strategy has been reported for large-scale synthesis of Mo_2N nanolayer coated MoO_2 hollow nanostructures, which show greatly improved electrochemical properties.

2698

Knitted and screen printed carbon-fiber supercapacitors for applications in wearable electronics

Kristy Jost, Daniel Stenger, Carlos R. Perez, John K. McDonough, Keryn Lian, Yury Gogotsi* and Genevieve Dion*

Energy storage is a key challenge to the full implementation of wearable electronics. In this work, custom knitted and screen printed supercapacitors are fabricated. Assembled devices have capacitances per area as high as 0.51 F cm^{-2} per device.

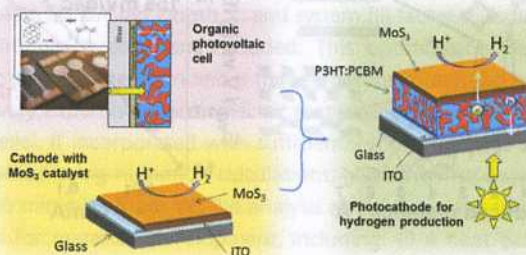


2706

A H_2 -evolving photocathode based on direct sensitization of MoS_3 with an organic photovoltaic cell

Tiphaine Bourgeteau, Denis Tondelier, Bernard Geffroy, Romain Brisse, Christel Laberty-Robert, Stéphane Campidelli, Rémi de Bettignies, Vincent Artero, Serge Palacin and Bruno Jusselme*

A new photocathode for hydrogen photoproduction has been designed by direct coupling of organic solar cells with a non-precious catalyst.

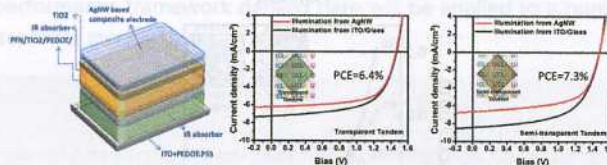


2714

High-performance semi-transparent polymer solar cells possessing tandem structures

Chun-Chao Chen, Letian Dou, Jing Gao, Wei-Hsuan Chang, Gang Li and Yang Yang*

A semi-transparent polymer solar cell possessing a tandem structure provides a high power conversion efficiency of 7%.

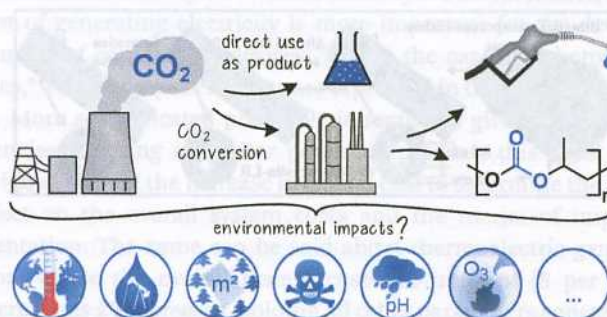


2721

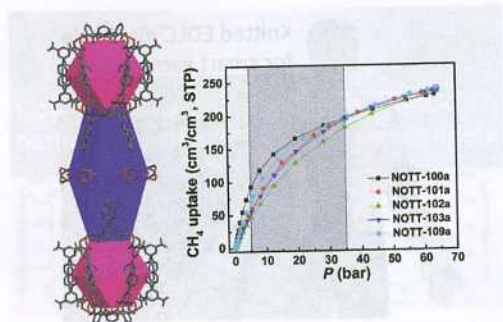
Life-cycle assessment of carbon dioxide capture and utilization: avoiding the pitfalls

Niklas von der Assen, Johannes Jung and André Bardow*

The article highlights the need of life-cycle assessment for an environmental evaluation of CO_2 capture and utilization and presents a framework to avoid common pitfalls for LCA of CCU.



2735

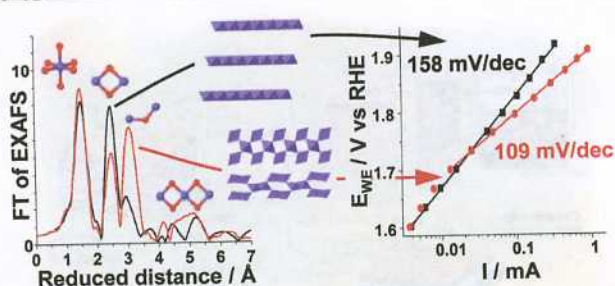


A series of metal–organic frameworks with high methane uptake and an empirical equation for predicting methane storage capacity

Yabing He,* Wei Zhou,* Taner Yildirim and Banglin Chen*

A series of metal–organic frameworks (NOTT-100a (MOF-505a), NOTT-101a, NOTT-102a, NOTT-103a and NOTT-109a) with variable open copper sites and micropore spaces have been examined as potential adsorbents for methane storage.

2745

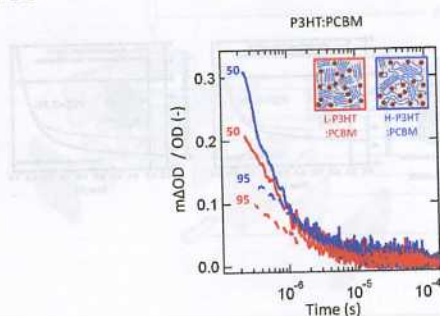


Electrochemical water splitting by layered and 3D cross-linked manganese oxides: correlating structural motifs and catalytic activity

Arno Bergmann,* Ivelina Zaharieva,* Holger Dau and Peter Strasser

Atomic scale structure–activity relationships of two different nano-structured manganese oxides, MnO_x, are established using a combination of X-ray absorption, diffraction and electrochemistry. The study reveals fundamental differences of general importance in the catalytic activity between layered and cross-linked structures.

2756

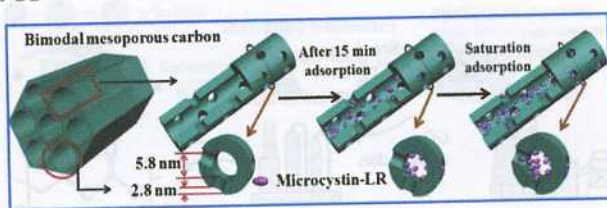


On the role of intermixed phases in organic photovoltaic blends

Paul Westacott, John R. Tumbleston, Safa Shoaee, Sarah Fearn, James H. Bannock, James B. Gilchrist, Sandrine Heutz, John deMello, Martin Heaney, Harald Ade, James Durrant, David S. McPhail and Natalie Stingelin*

Intermixed phases in photovoltaic blends are shown to have significant importance in processes leading to charge generation.

2765



Ordered mesoporous carbons and their corresponding column for highly efficient removal of microcystin-LR

Wei Teng, Zhangxiong Wu, Jianwei Fan, Hong Chen, Dan Feng, Yingying Lv, Jinxiu Wang, Abdullah M. Asiri and Dongyuan Zhao*

A comprehensive study about static, dynamic and competitive adsorption of mesoporous carbons towards microcystin-LR, with an unprecedented adsorption capacity of 526 mg g⁻¹.