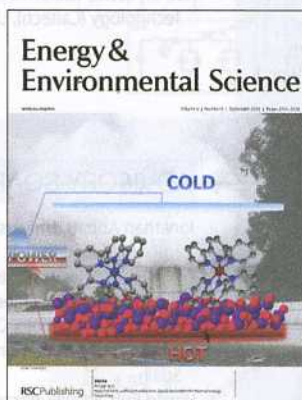


## IN THIS ISSUE

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**Cover**  
See Su *et al.*, pp. 2591–2596.  
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**Inside cover**  
See Pringle *et al.*, pp. 2639–2645.  
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## ANALYSIS

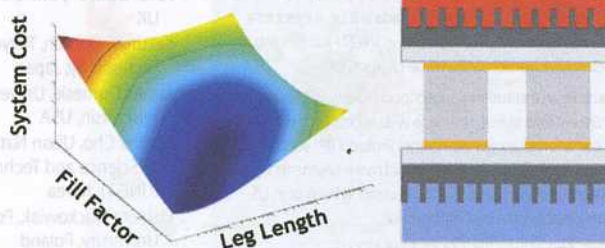
2561

### \$ 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

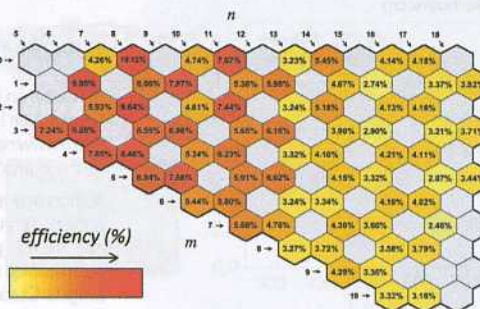


2572

### 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.

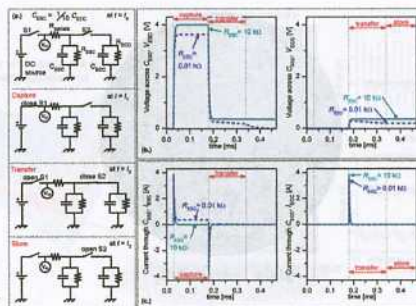


2578

### 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.



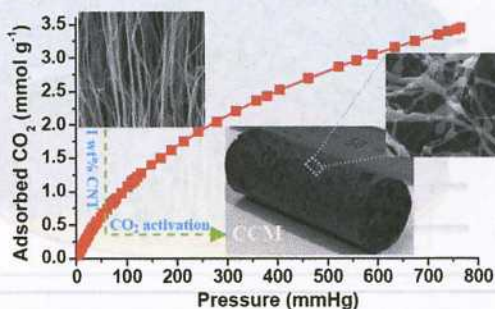
## COMMUNICATIONS

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 CO<sub>2</sub> adsorption properties of carbon composite monoliths.

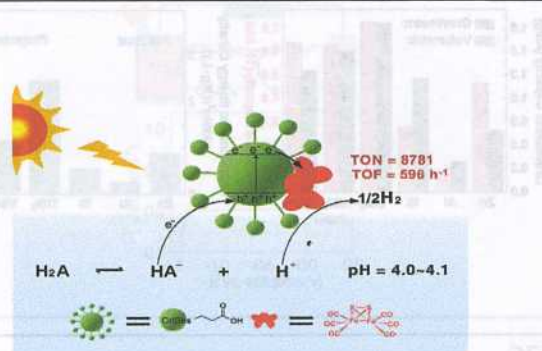


2597

### Interface-directed assembly of a simple precursor of [FeFe]-H<sub>2</sub>ase 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/Fe<sub>2</sub>S<sub>2</sub>(CO)<sub>6</sub> assembly of [FeFe]-hydrogenase enzyme, for efficient photocatalytic hydrogen evolution in water.

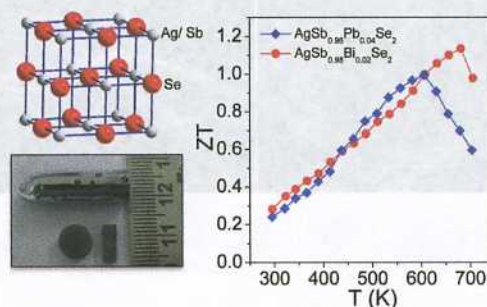


2603

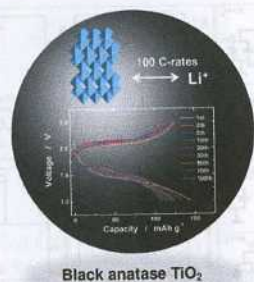
### High thermoelectric performance in tellurium free p-type AgSbSe<sub>2</sub>

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 AgSbSe<sub>2</sub>, which is ~190% higher compared to that of the pristine sample.



2609

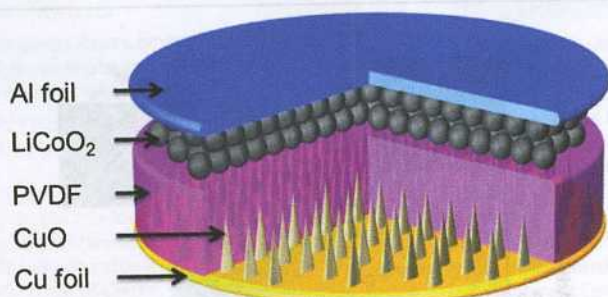
Black anatase TiO<sub>2</sub>

### 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 TiO<sub>2</sub> 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<sup>+</sup> insertion into and extraction from the host structure of anatase TiO<sub>2</sub> making it a unique, high rate electrode.

2615

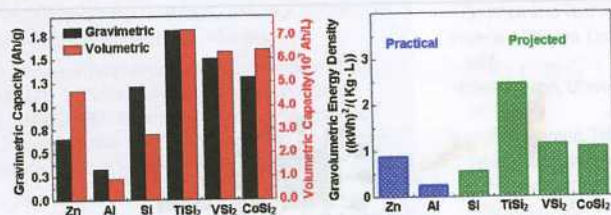


### CuO/PVDF nanocomposite anode for a piezo-driven self-charging lithium battery

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

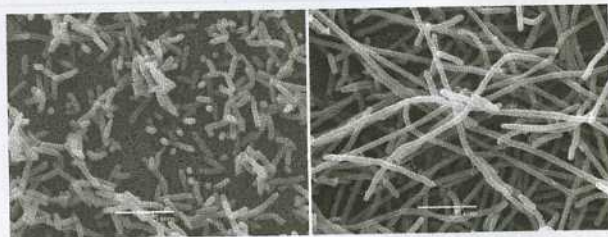


### Very high energy density silicide–air primary batteries

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\*

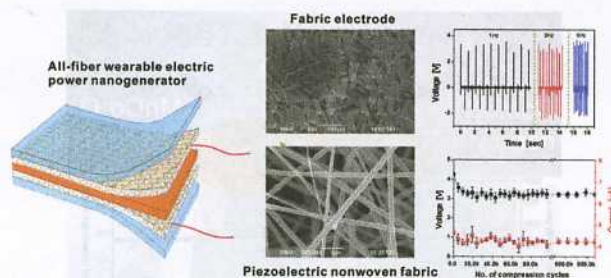
The elongated *Shewanella oneidensis* MR-1 cells (cisplatin-treated) showed up to a 5-fold improvement in current densities compared to normal, untreated cells.

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.

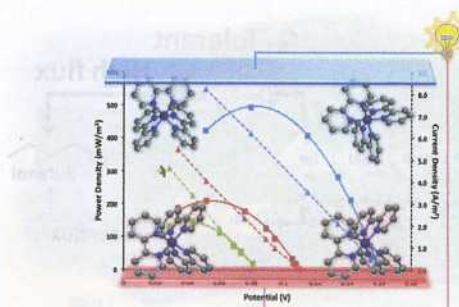


2639

### 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.

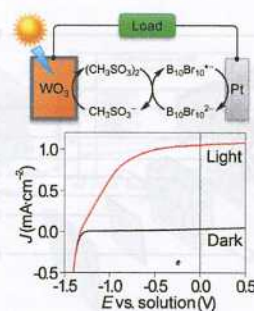


2646

### Photoelectrochemical oxidation of anions by WO<sub>3</sub> in aqueous and nonaqueous electrolytes

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

Nonaqueous photoelectrochemistry of WO<sub>3</sub> 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.

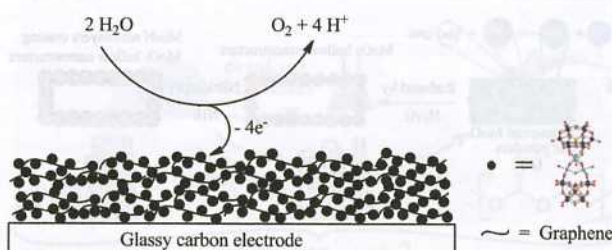


2654

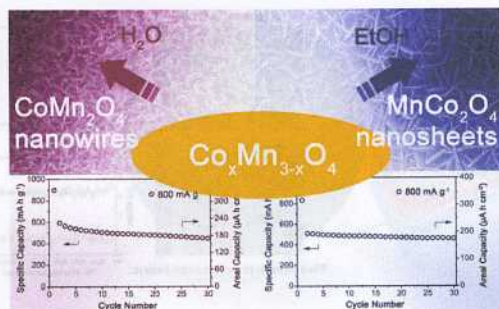
### Graphene-supported $[\{\text{Ru}_4\text{O}_4(\text{OH})_2(\text{H}_2\text{O})_4\}(\gamma\text{-SiW}_{10}\text{O}_{36})_2]^{10-}$ for highly efficient electrocatalytic water oxidation

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

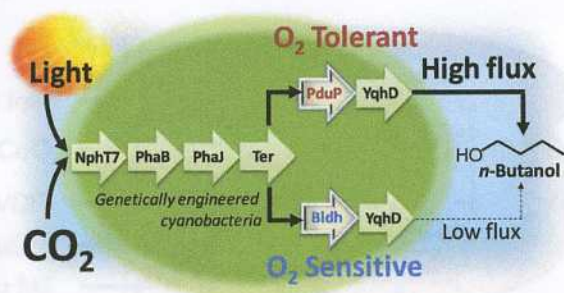


### Controlled synthesis of hierarchical $\text{Co}_x\text{Mn}_{3-x}\text{O}_4$ array micro-/nanostructures with tunable morphology and composition as integrated electrodes for lithium-ion batteries

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

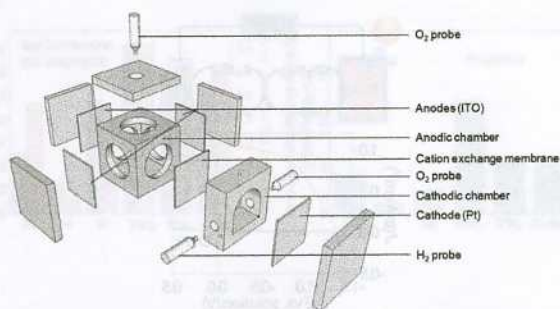


### Oxygen-tolerant coenzyme A-acylating aldehyde dehydrogenase facilitates efficient photosynthetic *n*-butanol biosynthesis in cyanobacteria

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  $\text{CO}_2$  using engineered cyanobacteria.

2682

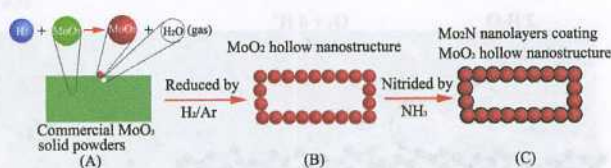


### Hydrogen production through oxygenic photosynthesis using the cyanobacterium *Synechocystis* sp. PCC 6803 in a bio-photoelectrolysis cell (BPE) system

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  $\text{H}_2$  using cyanobacteria and light with a biophotoelectrolysis cell (BPE).

2691



### Synthesis of $\text{Mo}_2\text{N}$ nanolayer coated $\text{MoO}_2$ 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  $\text{Mo}_2\text{N}$  nanolayer coated  $\text{MoO}_2$  hollow nanostructures, which show greatly improved electrochemical properties.

