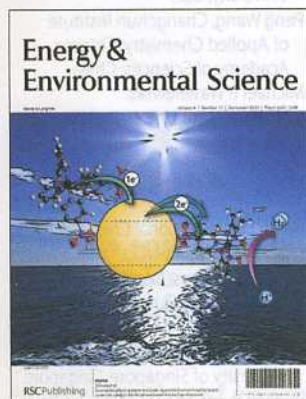


## IN THIS ISSUE

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**Cover**  
See Durrant *et al.*, pp. 3291–3300.  
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**Inside cover**  
See Jo *et al.*, pp. 3301–3307.  
Image reproduced by permission of Won Ho Jo from *Energy Environ. Sci.*, 2013, **6**, 3301.

## REVIEWS

3112

### Status and perspectives of CO<sub>2</sub> conversion into fuels and chemicals by catalytic, photocatalytic and electrocatalytic processes

Evgenii V. Kondratenko,\* Guido Mul, Jonas Baltusaitis, Gastón O. Larrazábal and Javier Pérez-Ramírez\*

Recent progress and future perspectives in CO<sub>2</sub> utilization for the production of energy carriers and commodity chemicals are discussed.

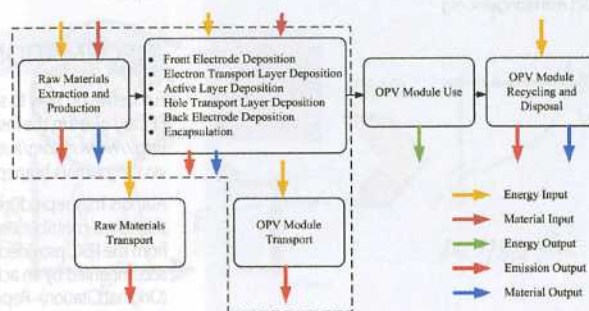


3136

### Life cycle analyses of organic photovoltaics: a review

Sebastien Lizin,\* Steven Van Passel, Ellen De Schepper, Wouter Maes, Laurence Lutsen, Jean Manca and Dirk Vanderzande

This paper reviews the available life cycle analysis (LCA) literature on organic photovoltaics (OPVs).

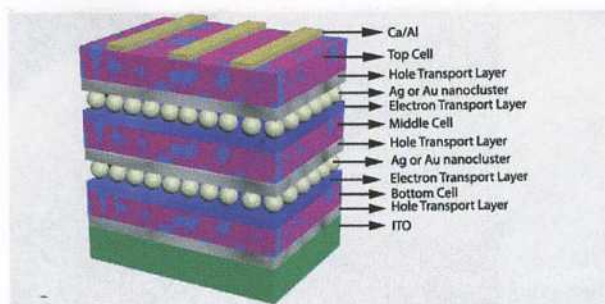


3150

### Triple junction polymer solar cells

Olusegun Adebajo, Purna P. Maharjan, Prajwal Adhikary, Mingtai Wang, Shangfeng Yang and Qiquan Qiao\*

Similar to single and double junction polymer solar cells, triple junction devices can also be fabricated from all-solution processing.



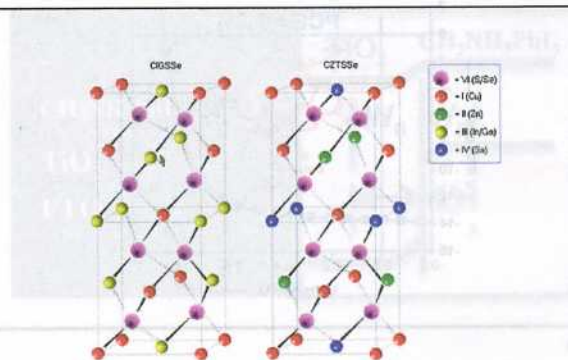
### PERSPECTIVES

3171

### The state and future prospects of kesterite photovoltaics

Alex Polizzotti,\* Ingrid L. Repins, Rommel Noufi, Su-Huai Wei and David B. Mitzi

A recent meeting of experts in kesterite and related photovoltaic materials yielded recommendations to accelerate this technology towards commercial-ready modules. This paper summarizes these conclusions while providing background on relevant areas.

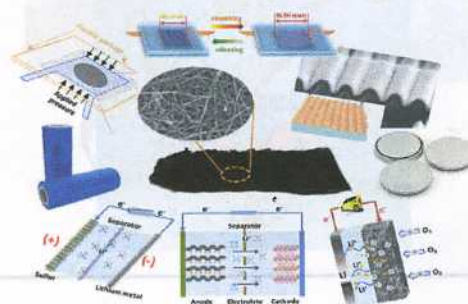


3183

### A perspective: carbon nanotube macro-films for energy storage

Zeyuan Cao and Bingqing (B. Q.) Wei\*

2-D CNT macro-films and their applications for various energy storage devices including supercapacitors and lithium-ion batteries are discussed.

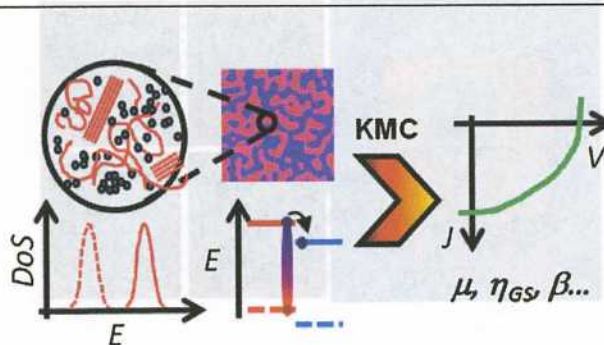


3202

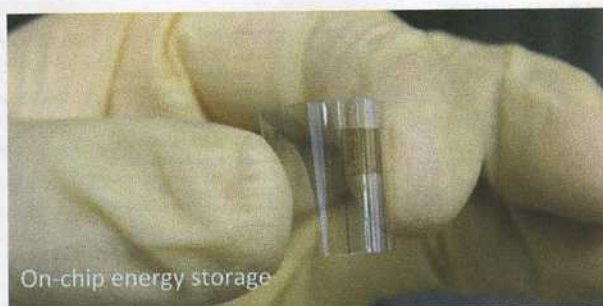
### Developing understanding of organic photovoltaic devices: kinetic Monte Carlo models of geminate and non-geminate recombination, charge transport and charge extraction

Chris Groves

This Perspective discusses how kinetic Monte Carlo models can be used to better understand the operation of organic photovoltaic devices.



3218

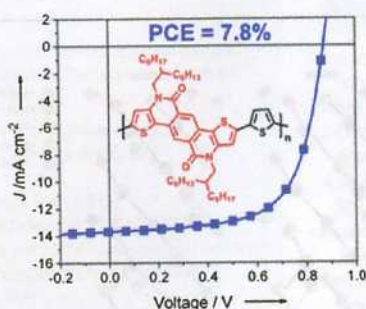


### On chip, all solid-state and flexible micro-supercapacitors with high performance based on $\text{MnO}_x/\text{Au}$ multilayers

Wenping Si, Chenglin Yan,\* Yao Chen, Steffen Oswald, Luyang Han and Oliver G. Schmidt

A new concept was introduced to fabricate on chip, all solid-state and flexible micro-supercapacitors based on  $\text{MnO}_x/\text{Au}$  multilayers.

3224

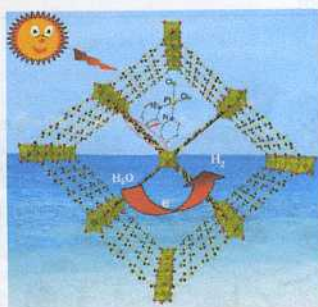


### A pentacyclic aromatic lactam building block for efficient polymer solar cells

Jiamin Cao, Qiaogan Liao, Xiaoyan Du, Jianhua Chen, Zuo Xiao,\* Qiqun Zuo and Liming Ding\*

A D–A conjugated polymer (PThTPTI) was developed by using a brand new pentacyclic aromatic lactam acceptor unit (TPTI). The polymer demonstrates an outstanding PCE of 7.8%.

3229

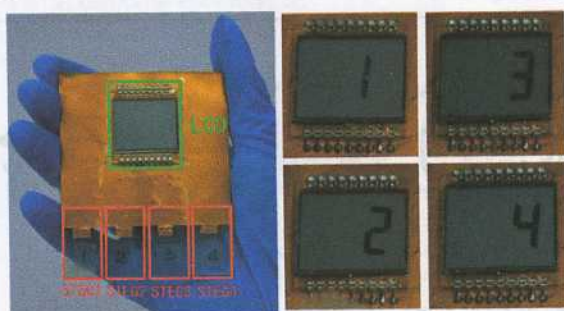


### Post-synthesis modification of a metal–organic framework to construct a bifunctional photocatalyst for hydrogen production

Tianhua Zhou, Yonghua Du, Armando Borgna, Jindui Hong, Yabo Wang, Jianyu Han, Wei Zhang and Rong Xu\*

A bifunctional photocatalyst MOF-253-Pt was constructed by post-synthetic modification. It serves both as photosensitizer and catalyst for visible-light photocatalytic  $\text{H}_2$  evolution from water.

3235



### A transparent single-friction-surface triboelectric generator and self-powered touch sensor

Bo Meng, Wei Tang, Zhi-han Too, Xiaosheng Zhang, Mengdi Han, Wen Liu and Haixia Zhang\*

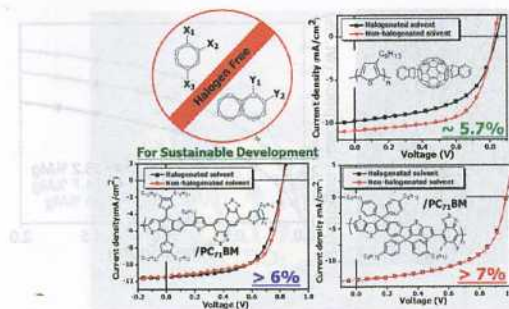
The self-powered touch sensor using 4 single-friction-surface triboelectric generators as touch pads indicates which pad was touched on an LCD.

3241

### Non-halogenated solvents for environmentally friendly processing of high-performance bulk-heterojunction polymer solar cells

Chu-Chen Chueh, Kai Yao, Hin-Lap Yip, Chih-Yu Chang, Yun-Xiang Xu, Kung-Shih Chen, Chang-Zhi Li, Peng Liu, Fei Huang, Yiwang Chen, Wen-Chang Chen and Alex K.-Y. Jen\*

High-performance bulk-heterojunction polymer solar cells processed from environmentally friendly non-halogenated solvents.

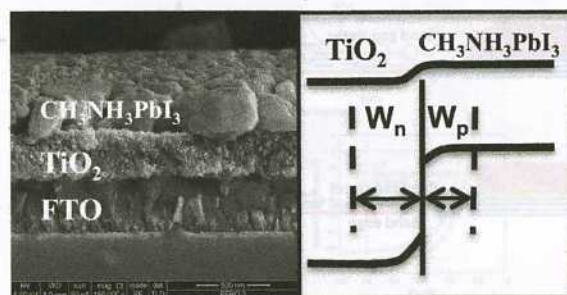


3249

### Depleted hole conductor-free lead halide iodide heterojunction solar cells

Waleed Abu Laban and Lioz Etgar\*

High efficiency hole conductor free  $\text{CH}_3\text{NH}_3\text{PbI}_3$  heterojunction solar cells show a depletion region, which extends to both n and p sides.

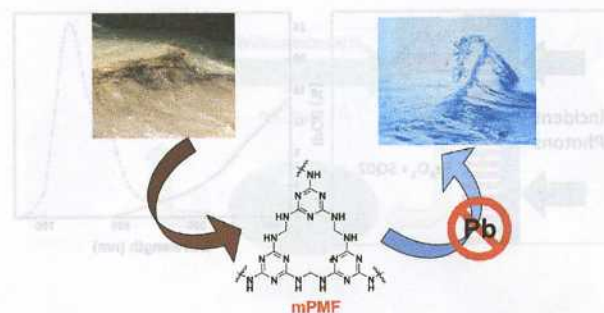


3254

### A mesoporous poly-melamine-formaldehyde polymer as a solid sorbent for toxic metal removal

Mei Xuan Tan, Yin Ngai Sum, Jackie Y. Ying\* and Yugen Zhang\*

A mesoporous poly-melamine-formaldehyde polymer was highly effective in removing lead ions from water to the ppt level within seconds.

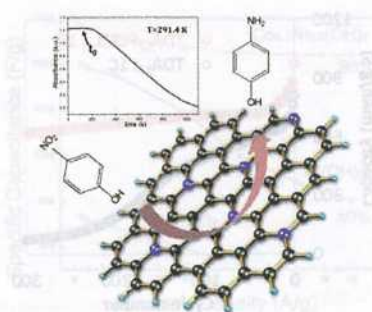


3260

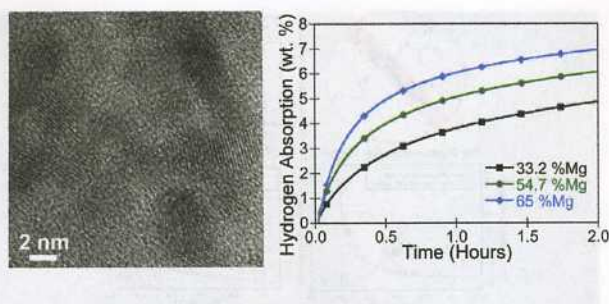
### Metal-free catalytic reduction of 4-nitrophenol to 4-aminophenol by N-doped graphene

Xiang-kai Kong, Zhi-yuan Sun, Min Chen, Chang-le Chen\* and Qian-wang Chen\*

N-Doped graphene was found to catalyse the reduction of 4-nitrophenol to 4-aminophenol, under mild conditions with high activity.



3267

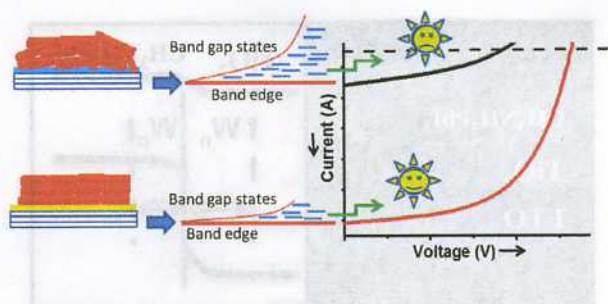


### Synergistic enhancement of hydrogen storage and air stability via Mg nanocrystal-polymer interfacial interactions

Anne M. Ruminski, Rizia Bardhan, Alyssa Brand, Shaul Aloni and Jeffrey J. Urban\*

Amelioration of material properties of functional nanocomposites is achieved through tailored nanoparticle-polymer interactions.

3272

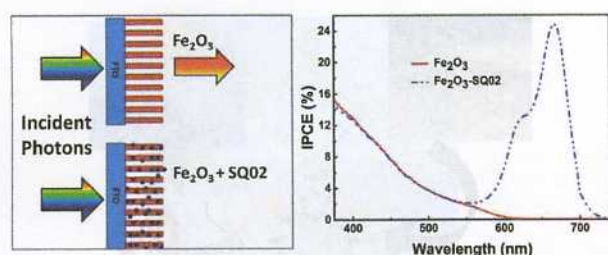


### The effect of structural order on solar cell parameters, as illustrated in a SiC-organic junction model

Pabitra K. Nayak, Lee Barnea-Nehoshtan, R. Soyoung Kim, Andrew Shu, Gabriel Man, Antoine Kahn, David Lederman, Yishay Feldman and David Cahen\*

To understand the title topic a model system of single crystal SiC, modified with an interfacial molecular monolayer of alkyl siloxane molecules, with polycrystalline pentacene deposited on it, was fabricated.

3280

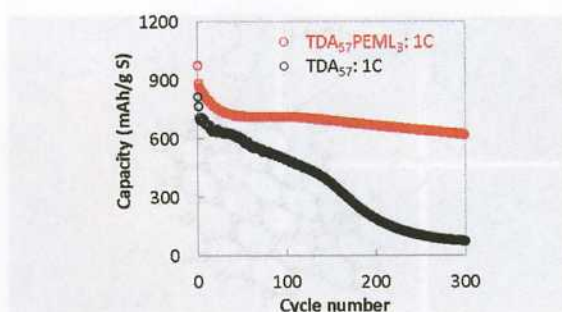


### Decoupling light absorption and charge transport properties in near IR-sensitized Fe<sub>2</sub>O<sub>3</sub> regenerative cells

Mulmudi Hemant Kumar, Nripan Mathews,\* Pablo P. Boix, Kazuteru Nonomura, Satvasheel Powar, Lam Yeng Ming,\* Michael Graetzel and Subodh G. Mhaisalkar

The complementary absorption properties of Fe<sub>2</sub>O<sub>3</sub> and SQ02 dye were used to study the charge transport properties in Fe<sub>2</sub>O<sub>3</sub>.

3286



### Ultrathin tunable ion conducting nanomembranes for encapsulation of sulfur cathodes

Claudiu B. Bucur, John Muldoon,\* Adrian Lita, Joseph B. Schlenoff, Ramy A. Ghostine, Steve Dietz and Gary Allred

Polyelectrolyte multilayer (PEML) nano-membranes impede polysulfide dissolution, therefore enhancing the performance of carbon sulfur composite cathodes.

