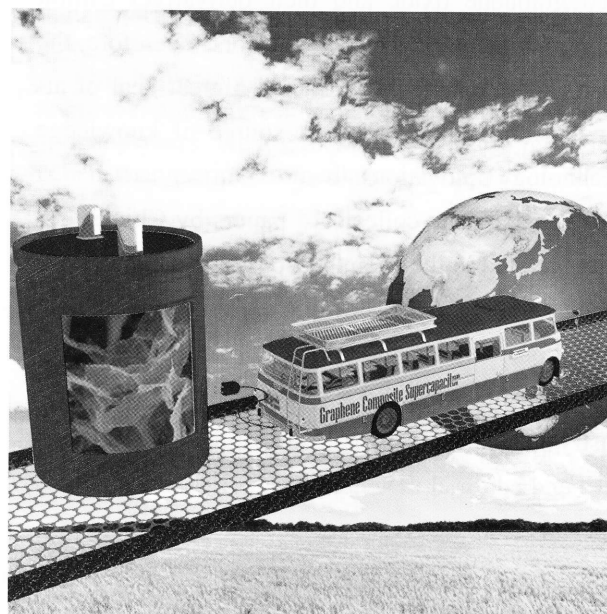


中国科学院科学出版基金资助出版

COVER PICTURE

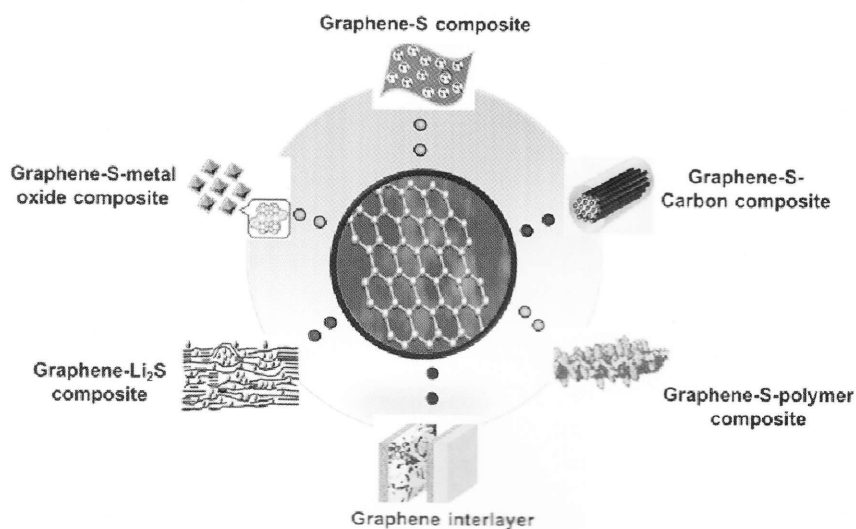
The cover picture shows the structure of three-dimensional graphene/Fe<sub>2</sub>O<sub>3</sub> composite as a promising electrode material for supercapacitor, as well as the potential application of supercapacitor in electric automobile. The composites are synthesized via a one-step reaction between graphene oxide and Fe<sup>2+</sup> at a mild condition. During the reaction, graphene oxide sheets are reduced and self-assemble into a 3D network, while Fe<sup>2+</sup> is converted into Fe<sub>2</sub>O<sub>3</sub> and deposited onto the graphene network. This structure facilitates the diffusion of the electrolyte and the electron transfer between Fe<sub>2</sub>O<sub>3</sub> and the current collector, thus endowing the composites with high capacitive performance. More details are discussed in the article by Bai *et al.* on page 67—72.



REVIEWS

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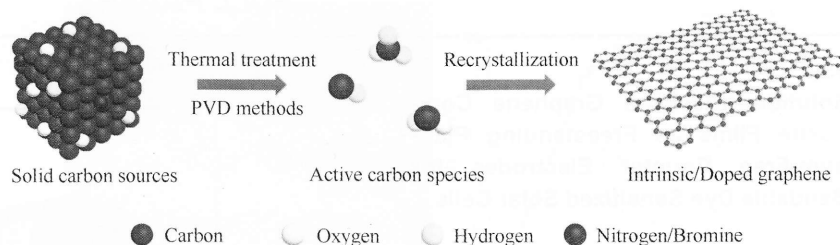
Graphene-Based Sulfur Composites for Energy Storage and Conversion in Li-S Batteries



Xingxing Gu, Shanqing Zhang,\* Yang-long Hou\*

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## From Solid Carbon Sources to Graphene



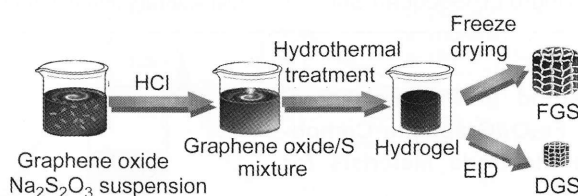
Active carbon species are extracted from solid carbon sources via thermal treatment or physical vapour deposition methods. These carbon containing species could recrystallize to form graphene with the assistance of metal catalyst or high energy.

Tao Liang, Yuhua Kong, Hongzheng Chen, Mingsheng Xu\*

## COMMUNICATIONS

41

## Spatially Interlinked Graphene with Uniformly Loaded Sulfur for High Performance Li-S Batteries

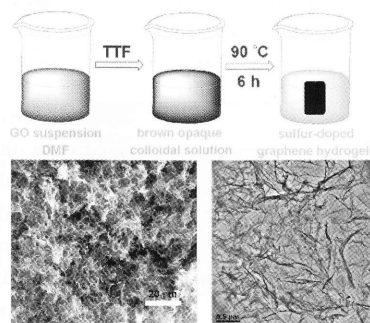


Donghai Liu, Chen Zhang, Xiaohui Lv, Xiaoyu Zheng, Lei Zhang, Linjie Zhi,\* Quan-Hong Yang\*

A three-dimensional graphene/S hybrid (G/S) is prepared. Freeze drying and evaporation-induced drying can induce different density and porous structure of G/S. The resulting hybrid can deliver a high specific capacity and good cyclability.

46

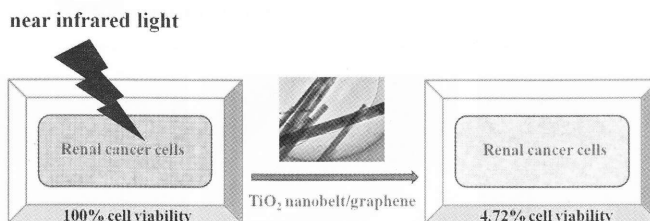
## Three Dimensional Sulfur-doped Graphene Hydrogels with Tetrathiafulvalene for High Performance Supercapacitors



Jingli Zhang, Man Jiang, Lingbao Xing,\* Kun Qin, Tianzhen Liu, Jin Zhou, Weijiang Si, Hongyou Cui, Shuping Zhuo\*

Three-dimensional porous sulfur-doped graphene hydrogels are prepared by using tetrathiafulvalene as reducing and doping agents. SGHs show superior capacitive performance with high specific capacitance, excellent rate capability and good long-term cycle stability in KOH electrolyte.

53

One-Pot Solvothermal Synthesis of  $\text{TiO}_2$  Nanobelt/Graphene Composites for Selective Renal Cancer Cells Destruction

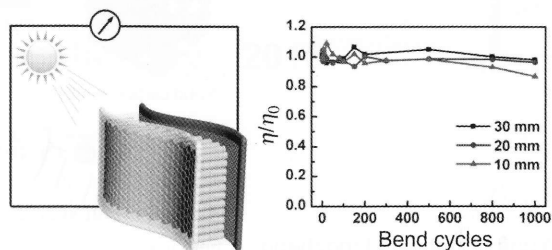
A facile one-pot solvothermal approach to synthesize  $\text{TiO}_2$  nanobelt/graphene composites ( $\text{TiO}_2/\text{GR}$ ) was developed. The reduction of graphene oxide (GO) nanosheets was accompanied by generation of  $\text{TiO}_2/\text{GR}$  in one-step. *In vitro* experiments revealed that the renal cancer (RENCA) cell viability decreased sharply to 4.72% in the presence of the resulting composites in the near infrared light (NIR) window.

Jinsheng Cheng,\* Weihong Wan, Wenjuan Zhu

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**Solution-Processed Graphene Composite Films as Freestanding Platinum-Free Counter Electrodes for Bendable Dye Sensitized Solar Cells**

Qinqin Zhou, Shan Chen, Miao Zhang, Liduo Wang, Yingru Li, Gaoquan Shi\*

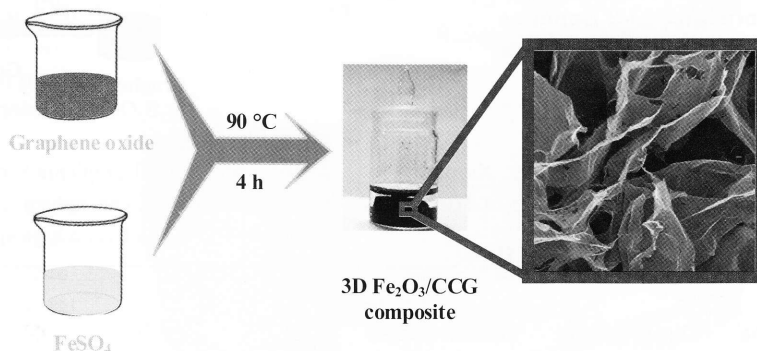


Dye sensitized solar cell with a TiO<sub>2</sub> nanotube/Ti mesh photoanode and a sulfuric acid-treated poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate)/less-defective reduced graphene oxide composite film counter electrode displayed an excellent mechanical stability and bending durability.

67

**A Facile Method to Prepare Three-Dimensional Fe<sub>2</sub>O<sub>3</sub>/Graphene Composites as the Electrode Materials for Supercapacitors**

Jifeng Wu, Anan Zhou, Zhifeng Huang, Lei Li, Hua Bai\*

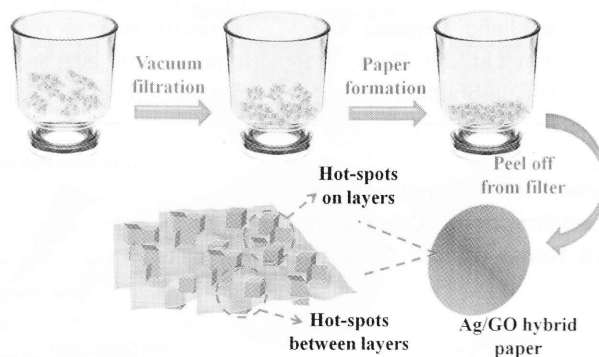


Three-dimensional (3D) Fe<sub>2</sub>O<sub>3</sub>/chemically converted graphene composites are synthesized *via* a one-step reaction between graphene oxide and Fe<sup>2+</sup> at a mild condition, and used as the electrode materials in supercapacitors. During the reaction, graphene oxide sheets are reduced and self-assemble into a 3D network, while Fe<sup>2+</sup> is converted into Fe<sub>2</sub>O<sub>3</sub> and deposited onto the graphene network. The composites showed high specific capacitance and good cycling stability, thus they are proved to be promising cathode materials for supercapacitors.

73

**Free-Standing Silver Nanocube/Graphene Oxide Hybrid Paper for Surface-Enhanced Raman Scattering**

Wei Fan, Miao Yue-E, Xingyi Ling,\* Tianxi Liu\*

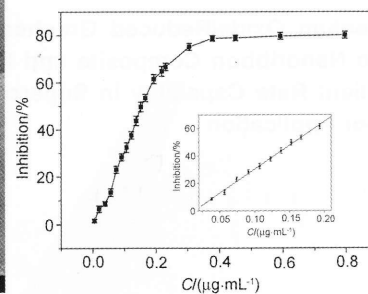
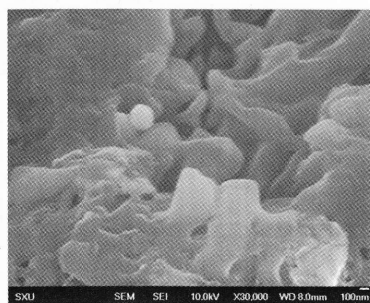


Free-standing and flexible Ag nanocube/GO hybrid papers have been fabricated and exhibit excellent SERS activity with prolonged life time and feasibility for real-time analysis.

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### An Acetylcholinesterase Biosensor Based on Graphene/Polyaniline Composite Film for Detection of Pesticides

Yanping Li, Yuyu Zhang, Gaoyi Han,\*  
Yaoming Xiao, Miaoyu Li, Wen Zhou

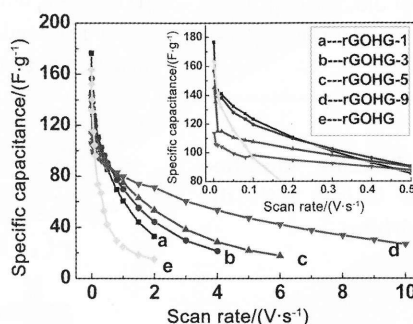


A novel interface G/PANI composite film was constructed during the electrodeposition. The resulting G/PANI-based enzyme biosensor exhibited excellent sensitivity, good stability, fast electrochemical response and good reproducibility.

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### Capacitive Performances of Reduced Graphene Oxide Hydrogel Prepared by Using Sodium Hypophosphite as Reducer

Cuixian Liu, Gaoyi Han,\* Yunzhen Chang, Yaoming Xiao, Yanping Li, Miaoyu Li, Haihan Zhou

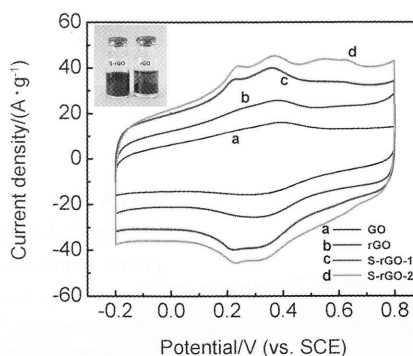


Hydrogels of reduced graphene oxide (rGOHGs) were synthesized by using sodium hypophosphite as reducing reagent. The rGOHGs prepared with different concentrations of  $\text{NaH}_2\text{PO}_2$  exhibit different microstructures and capacitive properties, some have larger specific capacitance and some have high-rate capability.

98

### Sulfonated Graphene Synthesized via a Green Route and Its Capacitive Properties

Wen Zhou, Gaoyi Han,\* Yaoming Xiao, Yunzhen Chang, Miaoyu Li, Yuyu Zhang



Sulfonated reduced graphene oxide synthesized by using *L*-ascorbic acid as reducing reagent and aryl diazonium salt of sulfanilic acid as functional group has large water-solubility and good capacitive properties.

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### One-Step Synthesis of Graphene/Polyaniline Nanotube Composite for Supercapacitor Electrode

Xin Fan,\* Zhewei Yang, Zheng Liu

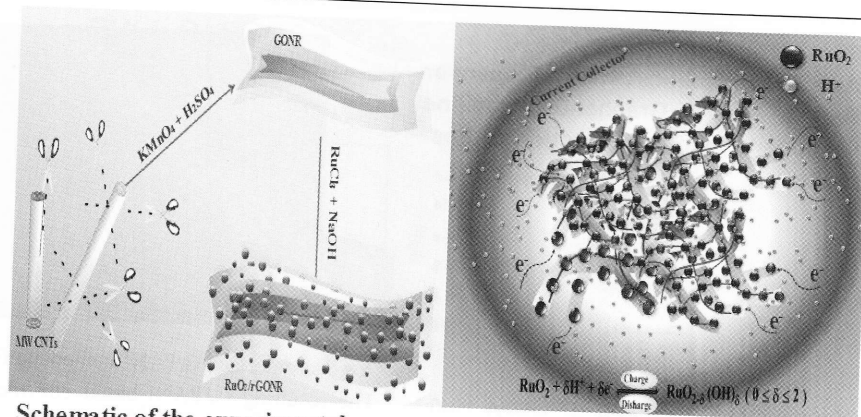


Graphene/polyaniline nanotube (GPNT) composite was synthesized using Vitamin C as both the template of polyaniline nanotube via in situ polymerization of aniline and the reducing agent of graphene oxide.

# CONTENT

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## Ruthenium Oxide/Reduced Graphene Oxide Nanoribbon Composite and Its Excellent Rate Capability in Supercapacitor Application



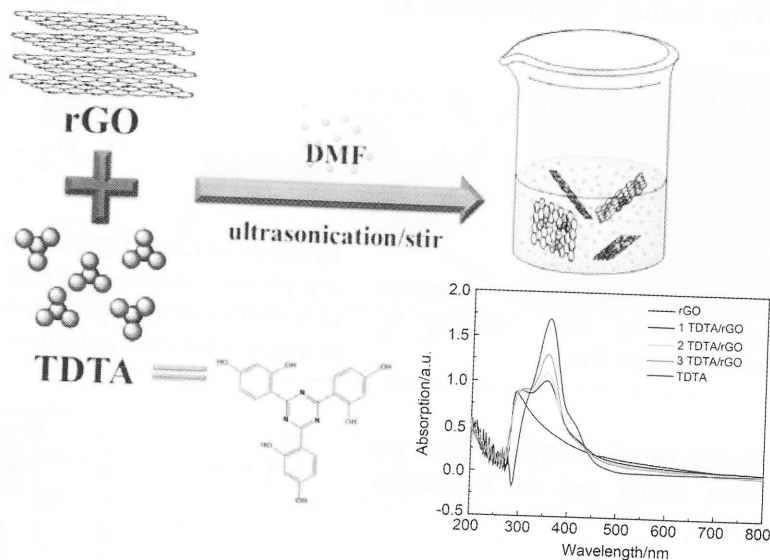
Schematic of the experimental process Schematic of the composite electrode

Ruijing Wang, Pengfei Jia, Yuying Yang, Ning An, Yadi Zhang, Hongying Wu, Zhongai Hu\*

rGONR was uniformly coated by  $\text{RuO}_2$  particles using a facile route. With unique microstructure and high  $\text{RuO}_2$  loading, the electrode material exhibits a high specific capacitance, and excellent rate capability.

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## A Derivative of s-Triazine Modified Reduced Graphene Oxide with the Function of UV-absorbing



TDTA/rGO, A new s-triazine derivative modified graphene composite, in which 2,4,6-tri(2,4-dihydroxyphenyl)-1,3,5-triazine (TDTA) was attached onto reduced graphene oxide (rGO) via the noncovalent functionalization approach, was reported. The composite is found to improve greatly the dispersity of rGO in DMF and to be a good UV-absorber.

Tianye Liu, Hongxia Yan,\* Zhengyan Chen, Peilun Xu, Shikun Su