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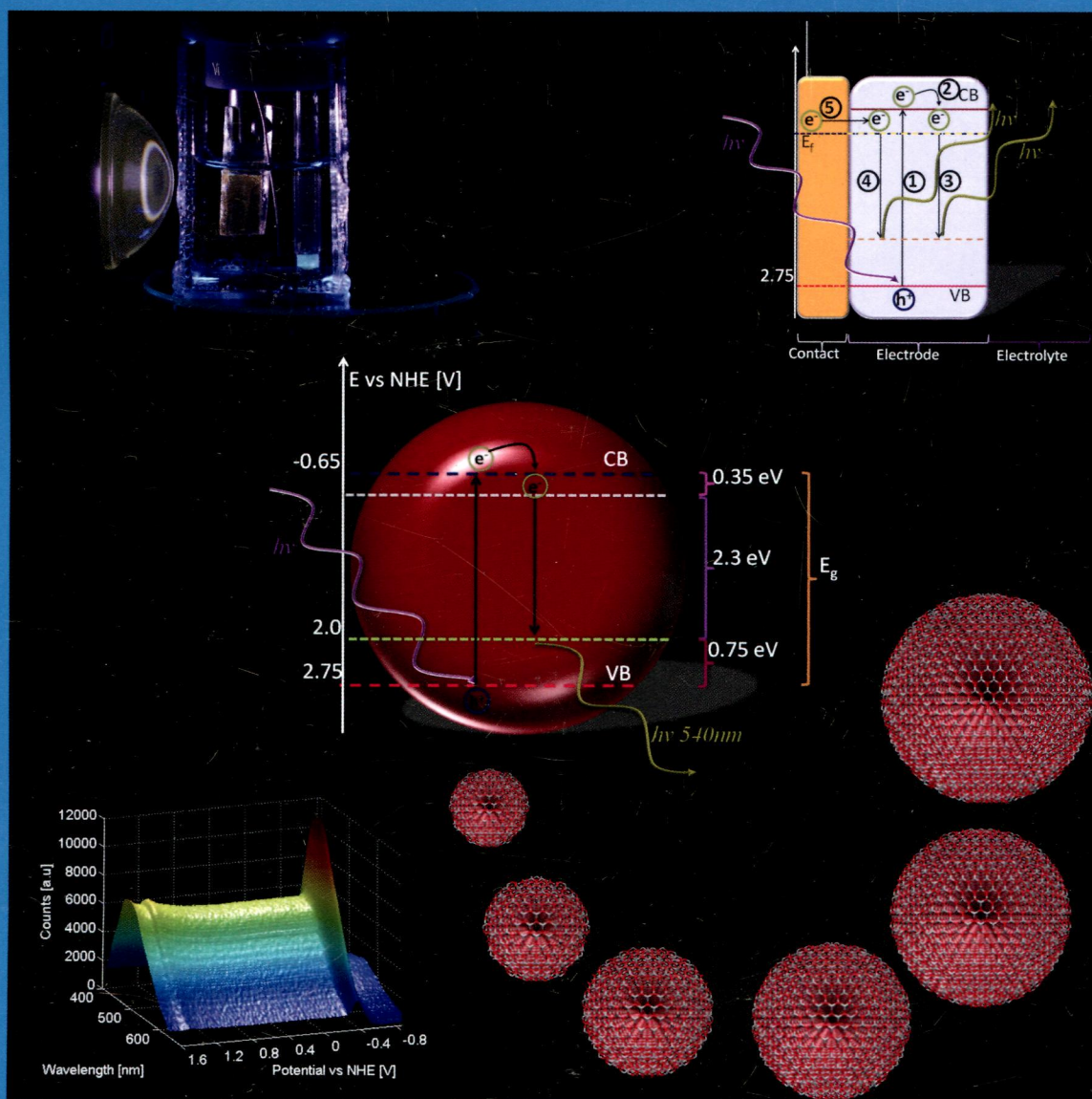
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# THE JOURNAL OF PHYSICAL CHEMISTRY

# C



Spectroelectrochemical  
Method for Locating  
Fluorescence Trap States  
in Nanoparticles and  
Quantum Dots  
(see page 5A)

ENERGY CONVERSION AND STORAGE, OPTICAL AND ELECTRONIC DEVICES,  
INTERFACES, NANOMATERIALS, AND HARD MATTER



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**ON THE COVER:** Spectroelectrochemical method for locating fluorescence trap states in nanoparticles and quantum dots. The fluorescence from trap states found in nanoparticles and quantum dots not only gives insight into the inner structure of the materials but also is often strongly dependent on the nature of the surfaces. A deeper understanding of these trap states and their absolute energy can be very valuable in the design and optimization of many devices utilizing nanoparticles and quantum dots. Here we have demonstrated how the absolute energetic position of the trap levels involved in fluorescence can be determined by measuring fluorescence as a function of applied potential under specified kinetic conditions. The method is applied to electrodes of ZnO quantum dots of increasing size. See page 5497.

## Articles

### Energy Conversion and Storage; Energy and Charge Transport

4877  [dx.doi.org/10.1021/jp309282n](https://doi.org/10.1021/jp309282n)

**Mitigating Phosphate Anion Poisoning of Cathodic Pt/C Catalysts in Phosphoric Acid Fuel Cells**

Qinggong He, Badri Shyam, Masahiko Nishijima, David Ramaker, and Sanjeev Mukerjee\*

4888  [dx.doi.org/10.1021/jp3093995](https://doi.org/10.1021/jp3093995)

**Morphology-Controlled Promoting Activity of Nanostructured MnO<sub>2</sub> for Methanol and Ethanol Electrooxidation on Pt/C**

Sumanta Kumar Meher and G. Ranga Rao\*

4901 [dx.doi.org/10.1021/jp309793z](https://doi.org/10.1021/jp309793z)

**Structure and Diffusion in Cross-Linked and Sulfonated Poly(1,3-cyclohexadiene)/Polyethylene Glycol-Based Proton Exchange Membranes**

Qifei Wang, David J. Keffer,<sup>†</sup> Suxiang Deng, and Jimmy Mays

4913 [dx.doi.org/10.1021/jp310011m](https://doi.org/10.1021/jp310011m)

**Effects of Li and Cl Codoping on the Electrochemical Performance and Structural Stability of LiMn<sub>2</sub>O<sub>4</sub> Cathode Materials for Hybrid Electric Vehicle Applications**

Dong-Wook Han, Won-Hee Ryu, Won-Keun Kim, Ji-Yong Eom,\* and Hyuk-Sang Kwon\*

4920  [dx.doi.org/10.1021/jp310855p](https://doi.org/10.1021/jp310855p)

**Ab Initio Study of a Molecular Crystal for Photovoltaics: Light Absorption, Exciton and Charge Carrier Transport**

Andriy Zhugayevych, Olena Postupna, Ronald C. Bakus II, Gregory C. Welch, Guillermo C. Bazan,\* and Sergei Tretiak\*

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- 4931  [dx.doi.org/10.1021/jp311207x](https://doi.org/10.1021/jp311207x)  
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- 4937  [dx.doi.org/10.1021/jp311729b](https://doi.org/10.1021/jp311729b)  
**Activation of Photocatalytic Water Oxidation on N-Doped ZnO Bundle-like Nanoparticles under Visible Light**  
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- 4943  [dx.doi.org/10.1021/jp3117825](https://doi.org/10.1021/jp3117825)  
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- 4951  [dx.doi.org/10.1021/jp3118902](https://doi.org/10.1021/jp3118902)  
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- 4957  [dx.doi.org/10.1021/jp311912b](https://doi.org/10.1021/jp311912b)  
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- 4971 [dx.doi.org/10.1021/jp312302x](https://doi.org/10.1021/jp312302x)  
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- 4980 [dx.doi.org/10.1021/jp4001303](https://doi.org/10.1021/jp4001303)  
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- 4986  [dx.doi.org/10.1021/jp400386q](https://doi.org/10.1021/jp400386q)  
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- 4992  [dx.doi.org/10.1021/jp4004642](https://doi.org/10.1021/jp4004642)  
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- 4999 [dx.doi.org/10.1021/jp305891p](https://doi.org/10.1021/jp305891p)  
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- 5014 [dx.doi.org/10.1021/jp307680t](https://doi.org/10.1021/jp307680t)  
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- 5028  [dx.doi.org/10.1021/jp310943s](https://doi.org/10.1021/jp310943s)  
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- 5043 [dx.doi.org/10.1021/jp310945e](https://doi.org/10.1021/jp310945e)  
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- 5051  [dx.doi.org/10.1021/jp310946x](https://doi.org/10.1021/jp310946x)  
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- 5067 [dx.doi.org/10.1021/jp311055b](https://doi.org/10.1021/jp311055b)  
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- 5075 [dx.doi.org/10.1021/jp311141k](https://doi.org/10.1021/jp311141k)  
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- 5084 [dx.doi.org/10.1021/jp3111887](https://doi.org/10.1021/jp3111887)  
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- 5095 [dx.doi.org/10.1021/jp3112292](https://doi.org/10.1021/jp3112292)  
**Thermo Neutral  $S_{\alpha}2$  Reaction within Pristine and Stone–Wales Defective BNNTs and CNTs**  
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5101  dx.doi.org/10.1021/jp3115397

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5112 dx.doi.org/10.1021/jp3116287

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5118 dx.doi.org/10.1021/jp3119132

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5132  dx.doi.org/10.1021/jp311996r

**Hierarchically Plasmonic Z-Scheme Photocatalyst of Ag/AgCl Nanocrystals Decorated Mesoporous Single-Crystalline Metastable Bi<sub>20</sub>TiO<sub>32</sub> Nanosheets**  
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5142  dx.doi.org/10.1021/jp312066n

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5154  dx.doi.org/10.1021/jp312108j

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5164  dx.doi.org/10.1021/jp3122819

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5172 dx.doi.org/10.1021/jp312286g

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5188  dx.doi.org/10.1021/jp3124583

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5208 dx.doi.org/10.1021/jp312621u

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5221  dx.doi.org/10.1021/jp312828d

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5249 dx.doi.org/10.1021/jp400142h

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5258 dx.doi.org/10.1021/jp400202e

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**Spin–Orbit Coupling Analyses of the Geometrical Effects on Phosphorescence in Ir(ppy)<sub>3</sub> and Its Derivatives**

Shiro Koseki,\* Na-oya Kamata, Toshio Asada, Shigeyuki Yagi, Hiroyuki Nakazumi, and Takeshi Matsushita

**High-Generation Dendrimers with Excimer-like Photoluminescence for the Detection of Explosives**

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**Temperature-Mediated Magnetism in Fe-Doped ZnO Semiconductors**

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**High-Pressure Optical Properties and Chemical Stability of Picene**

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**Unraveling Convolved Structural Transitions in SnTe at High Pressure**

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**Local Charge Storage in Thin Silicon Oxide Films: Mechanisms and Possible Applications**

Carsten Maedler and Harald Graaf\*

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**Understanding the Spectroscopic Properties and Aggregation Process of a New Emitting Boron Dipyrrromethene (BODIPY)**

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**Zn<sup>2+</sup>-Induced Folding of RNA to Produce Honeycomb-like RNA-Mediated Fluorescing Zn<sup>2+</sup>/PbSe Nanostructures**

Anil Kumar\* and Bhupender Singh

**Rough and Hollow Spherical Magnetite Microparticles: Revealing the Morphology, Internal Structure, and Growth Mechanism**

Benito Rodríguez-González,\* Fernando Vereda, Juan de Vicente, and Roque Hidalgo-Álvarez

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**Size-Dependent Extinction Coefficients and Transition Energies of Near-Infrared  $\beta$ -Ag<sub>2</sub>Se Colloidal Quantum Dots**

Marc-Antoine Langevin, Dany Lachance-Quirion, Anna M. Ritcey, and Claudine Ni. Allen\*

**Influence of Ligand–Precursor Molar Ratio on the Size Evolution of Modifiable Iron Oxide Nanoparticles**

Bin Qi, Longfei Ye, Roland Stone, Cindi Dennis, Thomas M. Crawford, and O. Thompson Mefford\*

5436  dx.doi.org/10.1021/jp311556b

**Stability and Relaxation Mechanisms of Citric Acid Coated Magnetite Nanoparticles for Magnetic Hyperthermia**

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5446  dx.doi.org/10.1021/jp4000544

**Magnetite Nanocrystals on Multiwalled Carbon Nanotubes as a Synergistic Microwave Absorber**

Zhijiang Wang,\* Lina Wu, Jigang Zhou, Wei Cai, Baozhong Shen, and Zhaohua Jiang\*

5453  dx.doi.org/10.1021/jp4001434

**Near Room Temperature Synthesis of Monodisperse TiO<sub>2</sub> Nanoparticles: Growth Mechanism**

Jenny Perez Holmberg, Ann-Cathrin Johnson, Johan Bergenholtz, Zareen Abbas, and Elisabet Ahlberg\*

5462  dx.doi.org/10.1021/jp400172s

**Electronic and Magnetic Properties of Infinite 1D Chains of Paddlewheel Carboxylates M<sub>2</sub>(COOR)<sub>4</sub> (M = Mo, W, Ru, Rh, Ir, Cu)**

Maxim V. Peskov,\* Xiao-He Miao, Dodi Heryadi, Jörg Eppinger, and Udo Schwingenschlögl

5470 dx.doi.org/10.1021/jp4001847

**Effect of Metal Impurities on the Tensile Strength of Carbon Nanotubes: A Theoretical Study**

Qinghong Yuan, Li Li,\* Qianshu Li,\* and Feng Ding\*

5475 dx.doi.org/10.1021/jp4002912

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Phuong T. M. Nguyen, Chunyan Fan, D. D. Do,\* and D. Nicholson

5485  dx.doi.org/10.1021/jp400573w

**In Situ Raman Studies of Electrically Reduced Graphene Oxide and Its Field-Emission Properties**

Satyaprakash Sahoo,\* Geetika Khurana, Sujit K. Barik, S. Dussan, D. Barrionuevo, and Ram S. Katiyar\*

5492 dx.doi.org/10.1021/jp400581j

**Van der Waals Torque Coupling between Slabs Composed of Planar Arrays of Nanoparticles**

R. Esquivel-Sirvent\* and George C. Schatz

5497  dx.doi.org/10.1021/jp311905t

**A Spectroelectrochemical Method for Locating Fluorescence Trap States in Nanoparticles and Quantum Dots**

T. Jesper Jacobsson and Tomas Edvinsson\*

5505 dx.doi.org/10.1021/jp401170j

**Tailoring Anisotropic Morphology at the Nanoregime: Surface Bonding Motif Determines the Morphology Transformation of ZnO Nanostructures**

Congting Sun and Dongfeng Xue\*

## Additions and Corrections

5512 dx.doi.org/10.1021/jp400575r

**Correction to "Site-Selective Excitation of "Exciplex Tuning" for Luminescent Nanoclusters of Dicyanoa[ftgentate(I) Ions Doped in Different Alkali Halide Crystals"**

Francois Baril-Robert, Xiaobo Li, David A. Welch, Benjamin Q. Schneider, Michael O'Leary, Christie L. Larocelle, and Howard H. Patterson\*

5513 dx.doi.org/10.1021/jp401263p

**Correction to "Functionalization of Azide-Terminated Silicon Surfaces with Glycans Using Click Chemistry: XPS and FTIR Study"**

A. C. Gouget-Laemmel,\* J. Yang, M. A. Lodhi, A. Siriwardena,\* D. Aureau, R. Boukherroub, J.-N. Chazalviel, F. Ozanam, and S. Szunerits\*