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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel) : **Fabrication of CuInS₂ and Cu(In,Ga)S₂ Thin Films by a Facile Spray Pyrolysis and their Photovoltaic and Photoelectrochemical Properties**

Nama/ Jumlah Penulis : **Gunawan/6**

Status Pengusul : penulis ke-2

Identitas Jurnal Ilmiah :

a. Nama Jurnal	: Journal Catalysis Science & Technology
b. Nomor ISSN	: 2044-4753
c. Vol, No., Bln Thn	: 3,7, Februari 2013
d. Penerbit	: Royal Society of Chemistry (RSC) Publishing
e. DOI artikel (jika ada)	: 10.1039/c3cy00020f
f. Alamat web jurnal	: https://www.rsc.org/journals-books-databases/about-journals/catalysis-science-technology/
Alamat Artikel	: https://pubs.rsc.org/--/content/articlelanding/2013/cy/c3cy00020f/unauth#!divAbstract
g. Terindex	: Web of Science

Kategori Publikasi Jurnal Ilmiah (beri ✓ pada kategori yang tepat)

☒	Jurnal Ilmiah Internasional
☐	Jurnal Ilmiah Nasional Terakreditasi
☐	Jurnal Ilmiah Nasional Tidak Terakreditasi

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Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
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	40	☐	☐	
a. Kelengkapan unsur isi jurnal (10%)	4			4
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	12			11
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11
Total = (100%)	40			37
Nilai Pengusul = 0,4/5 x 37 = 2,96				

Catatan Penilaian artikel oleh Reviewer:

1. Kesesuaian dan kelengkapan unsur isi jurnal:

Isi unsur jurnal lengkap sesuai yang dipersyaratkan oleh jurnal internasional. Yang terdiri dari judul, abstrak, dan metodologi, hasil dan pembahasan, kesimpulan dan ucapan terimakasih serta daftar Pustaka. Dengan similarity sangat baik (19%).

2. Ruang lingkup dan kedalaman pembahasan:

Isi artikel meliputi tentang fabrikasi lapis tipis CuInS₂ dan Cu(In, Ga)S₂ dengan spray pyrolysis dan sifat fotovoltan dan fotoelektrokimianya. Pembahasannya cukup mendalam dengan menggunakan instrumentasi pengujian yg sangat baik. Pembahasannya disertai referensi yang menguatkan data yang diperoleh.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Data/informasi yang disampaikan cukup baik dan mutakhir dan metodologinya disampaikan secara detil namun ada yang tidak semua dicantumkan pada penelitian ini. Referensi yang digunakan up to date (40% referensi kurang dari 5 th artikel terbit)

4. Kelengkapan unsur dan kualitas terbitan:

Unsur artikel lengkap, kualitas jurnal sangat bagus dan jurnal Q1 bidang kimia. Artikel ini terbit waktu pengusul masih S3 (2012-2015).

Semarang, 10 Jul 2021

Reviewer I

Prof. Dr. Dra. Meiny Suzery, M.S.

NIP. 196005101989032001

Unit Kerja :FSM Universitas Diponegoro

Bidang Ilmu: Kimia Organik

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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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Judul Jurnal Ilmiah (Artikel) : **Fabrication of CuInS₂ and Cu(In,Ga)S₂ Thin Films by a Facile Spray Pyrolysis and their Photovoltaic and Photoelectrochemical Properties**

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c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	12			12
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			12
Total = (100%)	40			40
Nilai Pengusul = 0,4/5 x 40 = 3,2				

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2. Ruang lingkup dan kedalaman pembahasan:

Cukup mendalam dalam membahas fabrikasi semikonduktor untuk solar cell dan karakterisasinya dengan instrumen yang lengkap XRD, SEM, EDX, serta karakterisa photocurrent property nya. (12)

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

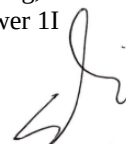
Referensi yang digunakan menunjang pembahasan dan metodologi yang digunakan uptodate (40 % referensi dengan tahun terbit sebelum 5 tahun artikel ini terbit (12)

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Secara umum kelengkapan unsur artikel lengkap. Kualitas jurnal Catalys Science & Tehnology yang diterbitkan oleh RS Publishing sangat bagus dan konsisten web of Sciene peringkat Q1 (Bidang Kimia) SJR 1,744 (2013). (12)
 Catatan: Artkel ini terbit ketika pengusul sekolah S3 (2012-2015) . Turnitin 19%.

Semarang, 2 Februari 2021

Reviewer 1I



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Bidang Ilmu: Kimia Analitik



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Catalysis Science and Technology
Volume 3, Issue 7, July 2013, Pages 1849-1854

Fabrication of CuInS_2 and Cu(In,Ga)S_2 thin films by a facile spray pyrolysis and their photovoltaic and photoelectrochemical properties (Article)

Ikeda, S. ✉, Nonogaki, M., Septina, W., Gunawan, G., Harada, T., Matsumura, M. 👤

Research Center for Solar Energy Chemistry, Osaka University, 1-3 Machikaneyama, Toyonaka 560-8531, Japan

Abstract

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Polycrystalline CuInS_2 chalcopyrite thin films were formed on a Mo-coated glass substrate by annealing of spray deposited precursor films in a sulfur atmosphere. Structural and photoelectrochemical analyses of CuInS_2 films obtained by annealing at 500 °C and 600°C revealed that a well-defined crystalline film was obtained by the 600°C annealing. Owing to these favorable properties, the solar cell with an $\text{Al:ZnO/CdS/CIS/Mo/}$ glass structure based on the 600°C annealed CuInS_2 film showed higher conversion efficiency than that obtained on the cell derived from the 500°C annealed CuInS_2 . Partial incorporation of Ga in the CuInS_2 film with a Ga/In ratio of ca. 0.2 to form a Cu(In,Ga)S_2 mixed crystal without any reduction of photoelectrochemical properties can be achieved by introduction of a Ga source in the sprayed solution. As a result, the solar cell based on the 600°C annealed Cu(In,Ga)S_2 film showed the best conversion efficiency (5.8%) of the present sprayed chalcopyrite films. By introduction of a CdS thin layer followed by loading Pt deposits, moreover, the 600°C annealed Cu(In,Ga)S_2 film worked as a photocathode for photoelectrochemical water splitting with applied bias potential of >0.65 V. © 2013 The Royal Society of Chemistry.

SciVal Topic Prominence ⓘ

Topic: Thin Film Solar Cells | Indium Sulfide | Chalcopyrite

Prominence percentile: 86.752 ⓘ

Indexed keywords

Engineering
uncontrolled terms

Chalcopyrite thin films Crystalline films Partial incorporation Photoelectrochemical analysis
Photoelectrochemical properties Photoelectrochemical water splitting Sprayed solution
Sulfur atmosphere

Engineering
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Annealing Cadmium sulfide Conversion efficiency Electrochemistry Gallium Glass
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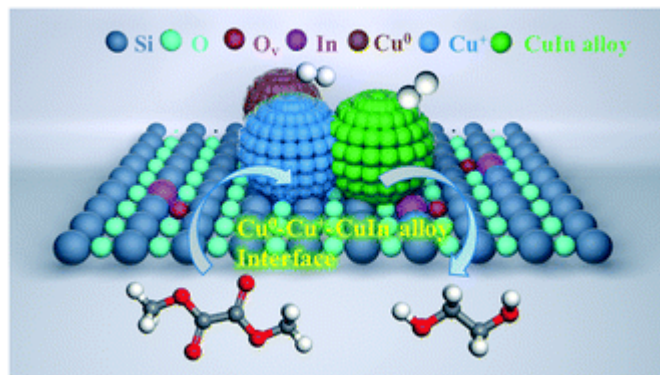
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CuIn/SiO₂ with 1.0 wt% indium shows the best catalytic performance for DMO hydrogenation to EG. The synergistic effect of Cu⁰-Cu⁺-CuIn alloy in activating H₂ molecules and carbonyl bonds is elucidated.

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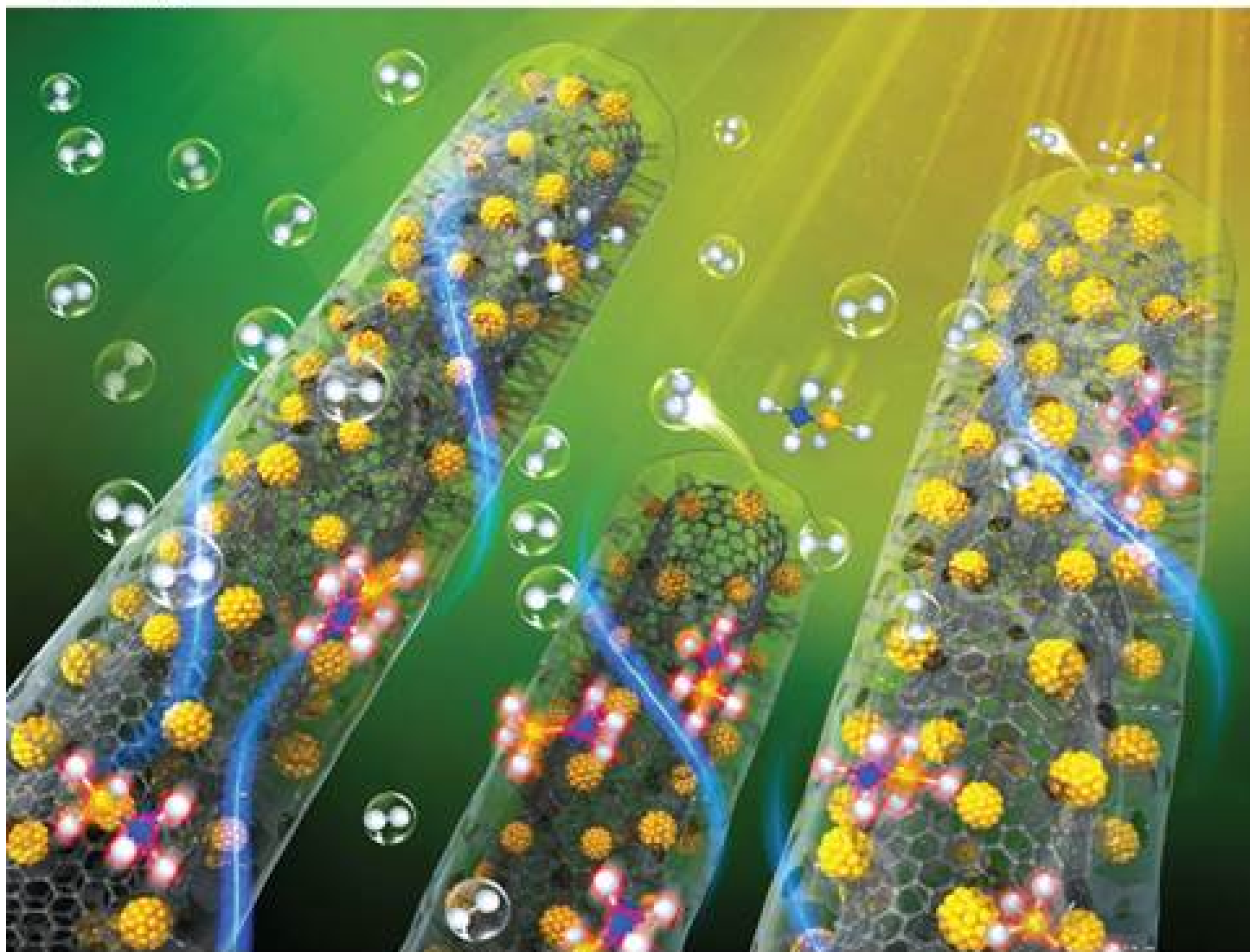
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Highly dispersed Pt nanoparticles supported on carbon nanotubes produced by atomic layer deposition for hydrogen generation from hydrolysis of ammonia borane

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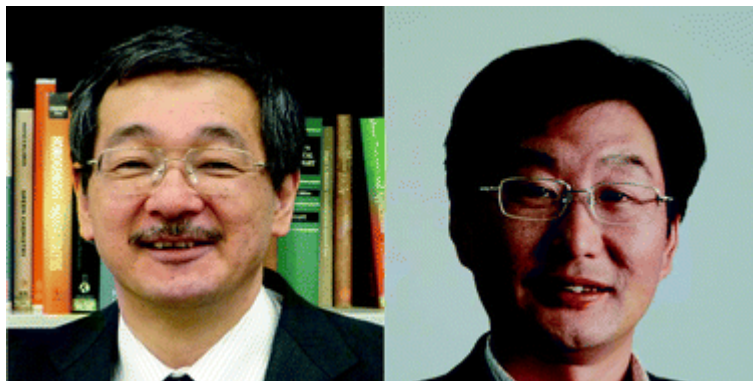
01 July 2013, Issue 7,
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Kazunari Domen and Licheng Sun

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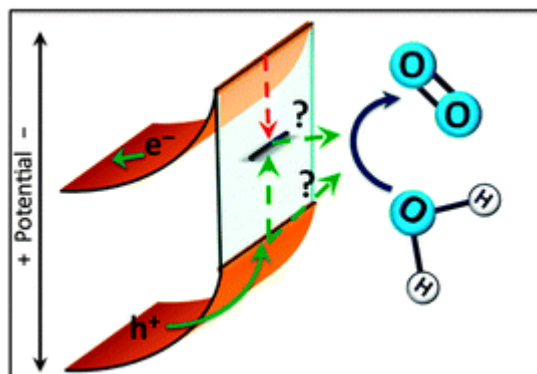
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Perspective

Photocatalytic water oxidation with hematite electrodes

Kelley M. H. Young, Benjamin M. Klahr, Omid Zandi and Thomas W. Hamann

A tale of two pathways; how does water oxidation proceed at the hematite surface?



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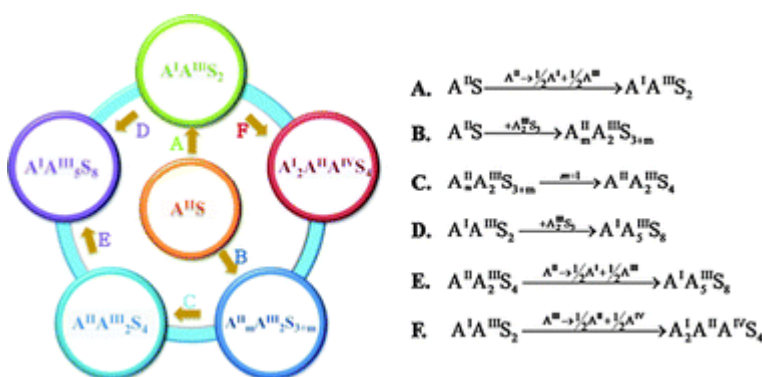
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Minireview

Metal sulphide semiconductors for photocatalytic hydrogen production

Kai Zhang and Liejin Guo

The important research progress in the development of visible light driven sulfide photocatalysts is presented in this review, which are classified according to their genealogy.



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Communication

Effect of the preparation conditions of a barium–tantalate photocatalyst on the overall photocatalytic splitting of H₂O

Yoshihisa Sakata, Takashi Kamigouchi, Shuhei Tanaka, Hirokazu Kamioka, Keisuke Matsumoto, Hirotaka Fujimori, Hayao Imamura and Junko N. Kondo

The photocatalytic activity of a barium–tantalum mixed oxide for H₂O splitting was related to its



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Communication

Assembling graphitic-carbon-nitride with cobalt-oxide-phosphate to construct an efficient hybrid photocatalyst for water splitting application

Rui-Lin Lee, Phong D. Tran, Stevin S. Pramana, Sing Yang Chiam, Yi Ren, Siyuan Meng, Lydia H. Wong and James Barber

A scalable process to synthesize an efficient hybrid photocatalyst composed of earth-abundant elements for water splitting is reported.



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Communication

Enhanced photocatalytic water oxidation on ZnO photoanodes in a borate buffer electrolyte

Feng-Qiang Xiong, Jingying Shi, Donge Wang, Jian Zhu, Wen-Hua Zhang and Can Li

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Paper

Carbon nitride nanosheets for photocatalytic hydrogen evolution: remarkably enhanced activity by dye sensitization

Yabo Wang, Jindui Hong, Wei Zhang and Rong Xu

A photocatalyst system consisting of Pt nanoparticles-loaded carbon nitride nanosheets and the Erythrosin B photosensitizer was constructed, which exhibits excellent photocatalytic activity for hydrogen evolution under visible light irradiation.

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Catal. Sci. Technol., 2013, **3**, 1703-1711

<https://doi.org/10.1039/C3CY20836B>

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Paper

Reduction degree of reduced graphene oxide (RGO) dependence of photocatalytic hydrogen evolution performance over RGO/ZnIn₂S₄ nanocomposites

A correlation between the photocatalytic performance for H₂ evolution and the RGO reduction degree over RGO/ZnIn₂S₄ nanocomposites was shown.



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Paper

Photocatalytic hydrodenitrogenation of aromatic cyanides on TiO₂ loaded with Pd nanoparticles

Yoshitsune Sugano, Keisuke Fujiwara, Yasuhiro Shiraishi, Satoshi Ichikawa and Takayuki Hirai

TiO₂ loaded with Pd particles, when photoirradiated in ethanol at room temperature, successfully promotes hydrodenitrogenation of aromatic cyanides, producing toluenes and triethylamine with almost quantitative yields.



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Archana Singh, Shery L. Y. Chang, Rosalie K. Hocking, Udo Bach and Leone Spiccia

We demonstrate the utility of macrocyclic nickel(II) amine complexes as pre-catalysts for the electrodeposition of nickel oxide films that are active water oxidation catalysts, and which exhibit electrochromic properties and enhanced catalytic activity upon exposure to visible light.



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Paper

Fabrication of SrTiO₃ exposing characteristic facets using molten salt flux and improvement of photocatalytic activity for water splitting

Hideki Kato, Makoto Kobayashi, Michikazu Hara and Masato Kakihana

An improvement in the activity of SrTiO₃ through the fabrication of crystals exposing high-index facets such as {120} and {121} has been achieved by the facile flux treatment using molten KCl.



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Catal. Sci. Technol., 2013, **3**, 1733-1738

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Hayato Yuzawa, Shoko Yoneyama, Akihito Yamamoto, Masanori Aoki, Kazuko Otake, Hideaki Itoh and Hisao Yoshida

Hydration of various alkenes proceeds according to the anti-Markovnikov rule over platinum-loaded titanium oxide photocatalysts, where electrophilic surface oxygen radical species would attack the double bond.



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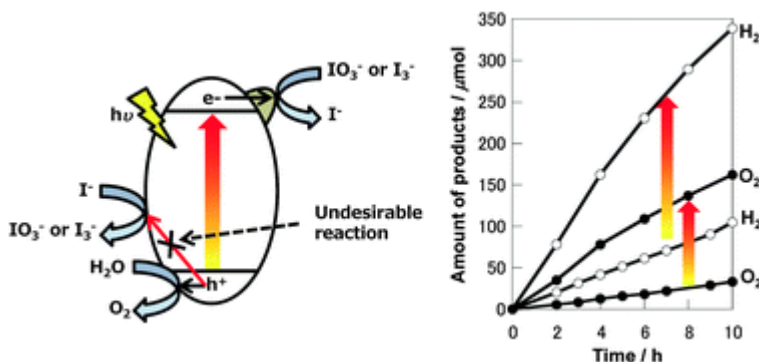
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Paper

Photocatalytic water splitting under visible light utilizing I₃⁻/I⁻ and IO₃⁻/I⁻ redox mediators by Z-scheme system using surface treated PtO_x/WO₃ as O₂ evolution photocatalyst

Yugo Miseki, Satoshi Fujiyoshi, Takahiro Gunji and Kazuhiro Sayama

Photocatalytic water splitting under visible light by the Z-scheme system was improved by surface treatment for PtO_x/WO₃ due to the effective suppression of undesirable reactions.



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Catal. Sci. Technol., 2013, **3**, 1750-1756

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Paper

Enhancement of visible light photocatalytic performances of $\text{Bi}_2\text{MoS}_2\text{O}_4$ nanoplates

Rui Shi, Tongguang Xu, Lihong Yan, Yongfa Zhu and Jun Zhou

A novel $\text{Bi}_2\text{MoS}_2\text{O}_4$ nanoplate photocatalyst with high-energy efficiency and high-activity has been successfully synthesized by a reflux method.

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Photocatalytic properties of *in situ* doped TiO₂-nanotubes grown by rapid breakdown anodization

Robert Hahn, Martin Stark, Manuela Sonja Killian and Patrik Schmuki

We introduce an *in situ* electrochemical doping approach during the growth of RBA-TiO₂ nanotubes using several oxygen containing metal anions.



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Paper

Effects of reaction temperature on the photocatalytic activity of photo-SCR of NO with NH₃ over a TiO₂ photocatalyst

Akira Yamamoto, Yuto Mizuno, Kentaro Teramura, Tetsuya Shishido and Tsunehiro Tanaka

Reaction temperature had a significant effect on the activity of the photo-assisted SCR of NO with NH₃.



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Arrangement effect of the di- μ -oxo dimanganese catalyst and $\text{Ru}(\text{bpy})_3^{2+}$ photoexcitation centers adsorbed on mica for visible-light-derived water oxidation

Masanari Hirahara, Hirosato Yamazaki, Satoshi Yamada, Kazuki Matsubara, Kenji Saito, Tatsuto Yui and Masayuki Yagi

The arrangement of Mn dimers as a catalyst and $\text{Ru}(\text{bpy})_3^{2+}$ as a photosensitizer in mica is important for photochemical water oxidation for an artificial PS II model.



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Paper

Noble metal-free $\text{Ni}(\text{OH})_2\text{-g-C}_3\text{N}_4$ composite photocatalyst with enhanced visible-light photocatalytic H_2 -production activity

Jiaguo Yu, Shuhan Wang, Bei Cheng, Zhang Lin and Feng Huang

$\text{Ni}(\text{OH})_2\text{-g-C}_3\text{N}_4$ composite photocatalysts were prepared by a simple precipitation method, exhibiting visible-light photocatalytic H_2 -production activity from triethanolamine aqueous solutions.



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Band energy levels and compositions of CdS-based solid solution and their relation with photocatalytic activities

Guan Zhang, Damián Monllor-Satoca and Wonyong Choi

Band energy levels and compositions of CdS were tuned by composing $(\text{AgIn})_x\text{Cd}_{2(1-x)}\text{S}_2$ ($x = 0-1$) solid solution, determined by photoelectrochemical measurements and DOS calculation, and correlated with their photocatalytic activities.



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Paper

Pyrochlore-like $\text{K}_2\text{Ta}_2\text{O}_6$ synthesized from different methods as efficient photocatalysts for water splitting

Che-Chia Hu, Te-Fu Yeh and Hsisheng Teng

The correlation between the photoluminescence properties and the activity of $\text{K}_2\text{Ta}_2\text{O}_6$ catalysts demonstrates the importance of regulating charge transport for effective photocatalytic water splitting.



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Paper

Visible light photocatalytic degradation of methylene blue by SnO₂ quantum dots prepared *via* microwave-assisted method

Xinjuan Liu, Likun Pan, Taiqiang Chen, Jinliang Li, Kai Yu, Zhuo Sun and Changqing Sun

SnO₂ quantum dots were synthesized using a microwave-assisted reaction for the photocatalytic degradation of methylene blue under visible light irradiation.



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Paper

To what extent do the nanostructured photoelectrodes perform better than their macrocrystalline counterparts?

Jan Augustynski and Renata Solarska

Taking example of the most frequently investigated photoanode materials, we show the actual situation as being largely contrasted going from a substantial improvement to a spectacular drop of the PEC performance.



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Paper

Water-soluble sulfonated-graphene-platinum nanocomposites: facile photochemical preparation with enhanced catalytic activity for hydrogen photogeneration

Hui-Hui Zhang, Ke Feng, Bin Chen, Qing-Yuan Meng, Zhi-Jun Li, Chen-Ho Tung and Li-Zhu Wu

A well-dispersed water-soluble nanocomposite GSO₃Pt, prepared by a facile photoreduction with Hantzsch 1,4-dihydropyridine, shows a higher photocatalytic efficiency for H₂ production.

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Paper

Design of visible-light photocatalysts by coupling of narrow bandgap semiconductors and TiO₂: effect of their relative energy band positions on the photocatalytic efficiency

Sher Bahadur Rawal, Sandipan Bera, Daeki Lee, Du-Jeon Jang and Wan In Lee

According to relative energy band positions between TiO₂ and visible-light-absorbing semiconductors, three different types of heterojunctions were designed, and their visible-light photocatalytic efficiencies analyzed.

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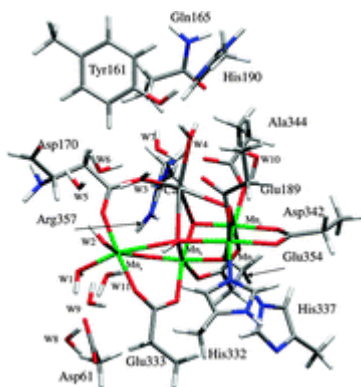
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Paper

Theoretical insight in to hydrogen-bonding networks and proton wire for the CaMn_4O_5 cluster of photosystem II. Elongation of Mn–Mn distances with hydrogen bonds

M. Shoji, H. Isobe, S. Yamanaka, Y. Umena, K. Kawakami, N. Kamiya, J.-R. Shen and K. Yamaguchi

Quantum mechanical (QM) and QM/molecular mechanics calculations of three cluster models were used to determine hydrogen bonding networks and proton wires for the proton release pathways of water oxidation in photosystem II.



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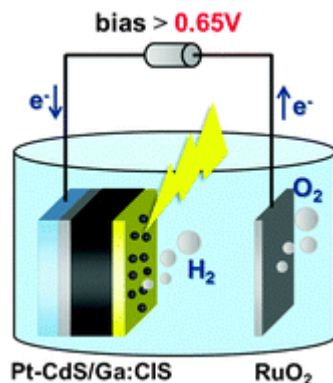
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Paper

Fabrication of CuInS_2 and $\text{Cu}(\text{In,Ga})\text{S}_2$ thin films by a facile spray pyrolysis and their photovoltaic and photoelectrochemical properties

Shigeru Ikeda, Midori Nonogaki, Wilman Septina, Gunawan Gunawan, Takashi Harada and Michio Matsumura

Sprayed polycrystalline CuInS_2 and $\text{Cu}(\text{In,Ga})\text{S}_2$ films were found to work as efficient solar cells and photocathodes for photoelectrochemical overall water splitting.



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From the journal:

Catalysis Science & Technology**Theoretical insight in to hydrogen-bonding networks and proton wire for the CaMn_4O_5 cluster of photosystem II. Elongation of Mn–Mn distances with hydrogen bonds†**[M. Shoji](#),^{*a} [H. Isobe](#),^b [S. Yamanaka](#),^c [Y. Umena](#),^d [K. Kawakami](#),^d [N. Kamiya](#),^d [J.-R. Shen](#)^b and [K. Yamaguchi](#)^{*ef}**Author affiliations**

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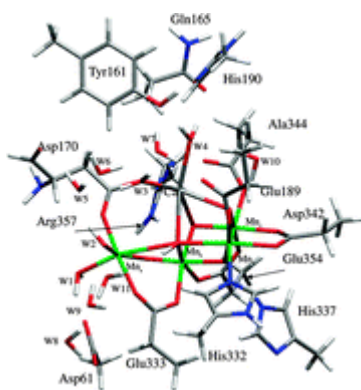
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Abstract

Quantum mechanical (QM) and QM/molecular mechanics (MM) calculations of three different cluster models have been performed to shed light on hydrogen bonding networks and proton wires for proton

release pathways (PRP) of water oxidation reactions in the oxygen evolving complex (OEC) of photosystem II (PSII). Positions of all the hydrogen atoms in an extended QM Model III including the second coordination sphere for the active-site CaMn_4O_5 complex of OEC of PSII have been optimized assuming the geometry of heavy atoms determined by the recent high-resolution X-ray diffraction (XRD) experiment of PSII refined to 1.9 Å resolution. Full geometry optimizations of the first coordination sphere model (QM Model I) embedded in the Model III and QM (QM Model I plus seven water molecules, namely QM Model II)/MM models, together with full QM Model III, have also been conducted to elucidate confinement effects for geometrical parameters of the CaMn_4O_5 cluster by proteins. Computational results by these methods have elucidated the $\text{O}\cdots\text{O}(\text{N})$, $\text{O}\cdots\text{H}$ distances and $\text{O}(\text{N})\text{--H}\cdots\text{O}$ angles for hydrogen bonds in proton release paths (PRP) I and II that construct a proton wire from Asp61 toward His190. The hydrogen-bonding structures revealed have also been examined in relation to the possibilities of protonation of bridge oxygen dianions within the CaMn_4O_5 cluster. The optimized inter-atomic distances by QM Models I and III, together with QM(Model II)/MM, have elucidated the elongation of the Mn–Mn distances with hydrogen bonds and variations of the $\text{Mn}_\text{d}\text{--O}_{(5)}$ length with confinement effects by protein. Implications of the computational results are discussed in relation to the available EXAFS experiments, and internal, semi-internal and external reductions of Mn ions and long Mn–Mn distances of the high-resolution (SP8) XRD, and rational design of artificial catalysts for water oxidation that are current topics in the field of OEC of PSII.



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Catalysis Science & Technology

Enhancement of visible light photocatalytic performances of Bi₂MoS₂O₄ nanoplates†

[Rui Shi](#),^{ab} [Tongguang Xu](#),^b [Lihong Yan](#),^b [Yongfa Zhu](#)^{*a} and [Jun Zhou](#)^{*b}

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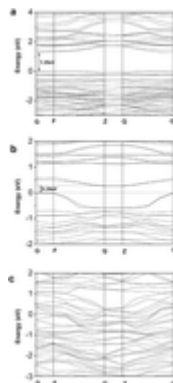
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Abstract

A novel Bi₂MoS₂O₄ nanoplate photocatalyst with high-energy efficiency and high-activity has been successfully synthesized by a reflux method. The visible-light response of Bi₂MoS₂O₄ could extend from 480 to 630 nm compared with Bi₂MoO₆. Compared with Bi₂MoO₆, the photocatalytic activities of the Bi₂MoS₂O₄ sample increased about 0.4 and 4.6 times for degradation of methylene blue (MB) under UV and visible-light ($\lambda > 510$ nm) irradiation, respectively. Density functional calculations revealed that Bi₂MoS₂O₄ had a narrower band gap and wider valence bandwidth compared with Bi₂MoO₆ because S 3p orbitals contributed to the valence band formation. The high energy efficiency of Bi₂MoS₂O₄ photocatalysts came from a narrow bandgap and the high activity came from a wider and dislocated valence band of Bi₂MoS₂O₄. Furthermore, the synthesis of Bi₂MoS₂O₄ could afford guidance for designing the other high-energy efficient and highly active photocatalysts.



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