

Catalysis Science & Technology

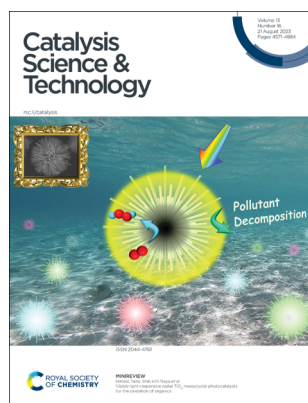
A multidisciplinary journal focussing on all fundamental science and technological aspects of catalysis

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ISSN 2044-4761 CODEN CSTAGD 13(16) 4571–4884 (2023)



Cover

See Hiroaki Tada, Shin-ichi Naya *et al.*, pp. 4581–4589.
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Inside cover

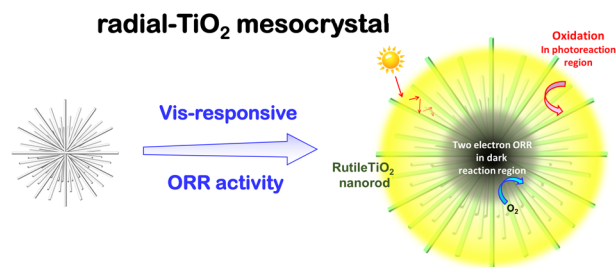
See Fumiaki Amano *et al.*, pp. 4640–4645.
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MINI REVIEWS

4581

Visible light-responsive radial TiO₂ mesocrystal photocatalysts for the oxidation of organics

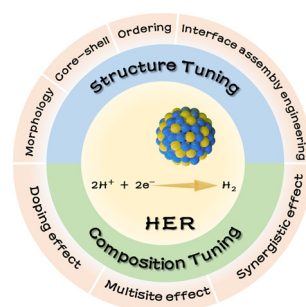
Hiroaki Tada,* Atsunobu Akita and Shin-ichi Naya*



4590

Reasonably constructed nano-alloyed materials as highly efficient electrocatalysts for the hydrogen evolution reaction

Lin-Wei Chen* and Lei Wang*



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Catalysis Science & Technology electronic: ISSN 2044-4761

is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK.

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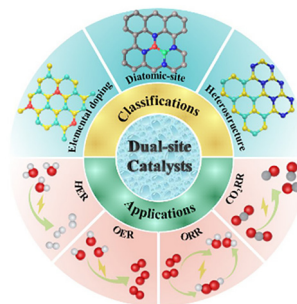


MINI REVIEWS

4615

Recent progress of dual-site catalysts in emerging electrocatalysis: a review

Min Zhou,* Weijie Kong, Mengyun Xue, Hangfei Li, Muhammad Afsar Khan, Bitao Liu,* Fei Lu* and Xianghua Zeng

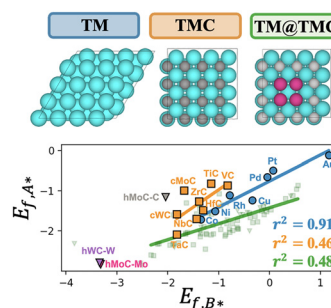


COMMUNICATION

4635

Breaking linear scaling relationships with transition metal carbides

Hector Prats* and Michail Stamatakis

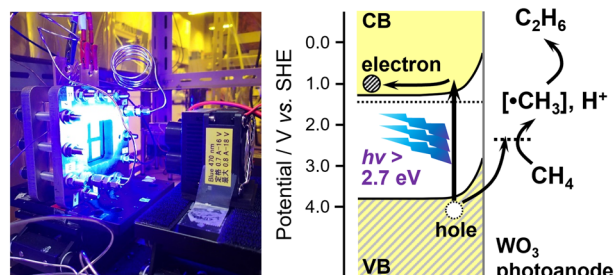


PAPERS

4640

Photoelectrochemical C–H activation of methane to methyl radical at room temperature

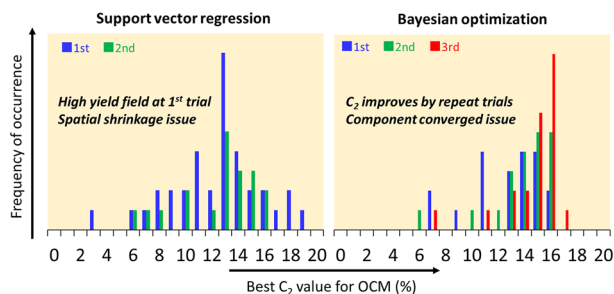
Fumiaki Amano,* Ayami Shintani, Tatsuya Sakakura, Yoshiyuki Takatsuji and Tetsuya Haruyama



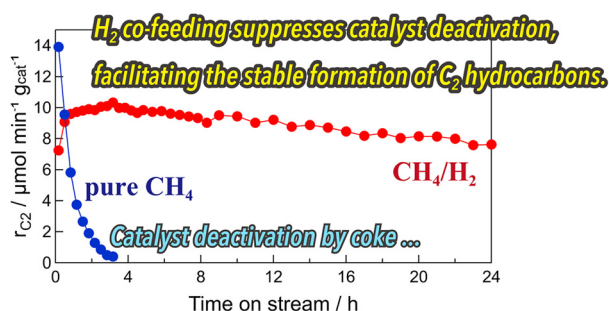
4646

Leveraging machine learning engineering to uncover insights into heterogeneous catalyst design for oxidative coupling of methane

Shun Nishimura,* Xinyue Li, Junya Ohyama and Keisuke Takahashi*



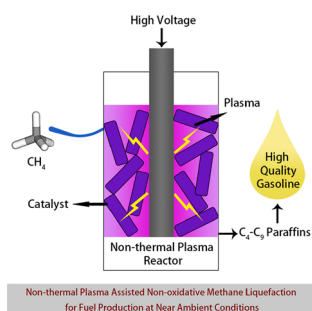
4656



Dehydrogenative coupling of methane over Pt/Al₂O₃ catalysts: effect of hydrogen co-feeding

Tatsuki Tomono, Riku Takamura, Miru Yoshida-Hirahara, Tomokazu Yamamoto, Syo Matsumura, Hideki Kurokawa and Hitoshi Ogihara*

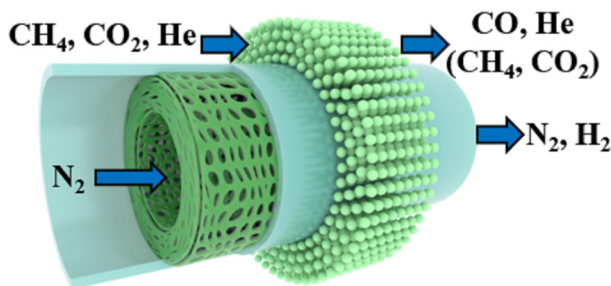
4665



Non-thermal plasma assisted non-oxidative methane liquefaction for fuel production at near ambient conditions

Shijun Meng, Wenping Li, Zhaofei Li and Hua Song*

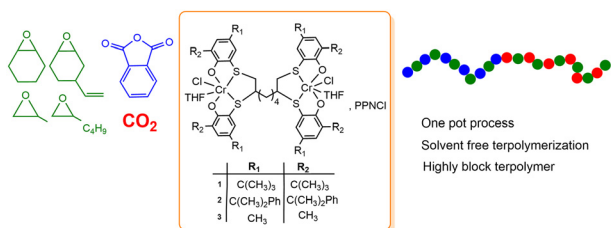
4673



Preparation of BCYF_{0.10}-YDC/BCYF_{0.10}-Ni dual-layer hollow fiber membrane for dry reforming of methane and hydrogen purification

Jie Wang, Baolei Shao, Claudia Li, Jian Song,* Bo Meng, Xiuxia Meng, Naitao Yang, Sibudjing Kawi, Jaka Sunarso,* Xiaoyao Tan and Shaomin Liu

4684



Dinuclear chromium complexes with [OSSO]-type ligands in the copolymerization of epoxides with CO₂ and phthalic anhydride

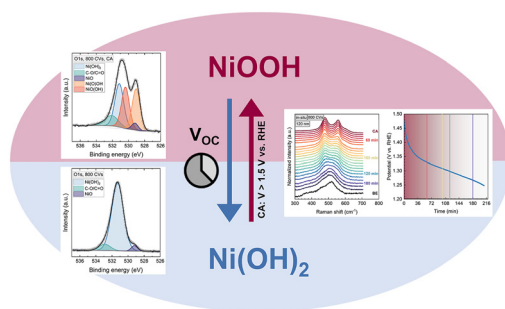
Fatemeh Niknam, Alina Denk, Antonio Buonerba, Bernhard Rieger, Alfonso Grassi and Carmine Capacchione*



4693

Stability and decomposition pathways of the NiOOH OER active phase of NiO_x electrocatalysts at open circuit potential traced by *ex situ* and *in situ* spectroscopies

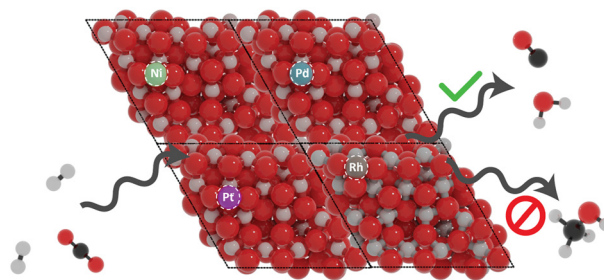
Julia Gallenberger,* Harol Moreno Fernández, Achim Alkemper, Mohan Li, Chuanmu Tian, Bernhard Kaiser and Jan Philipp Hofmann*



4701

A computational study of CO₂ hydrogenation on single atoms of Pt, Pd, Ni and Rh on In₂O₃(111)

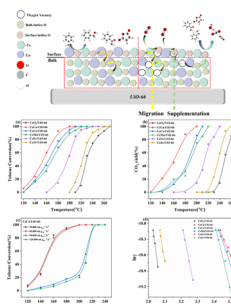
Francesco Cannizzaro, Sjoerd Kurtstjens, Tom van den Berg, Emiel J. M. Hensen* and Ivo A. W. Filot*



4716

Ceria-based oxide catalysts supported on metal-organic frameworks: selective oxidation of toluene to CO₂ and the doped metal-activity relationship

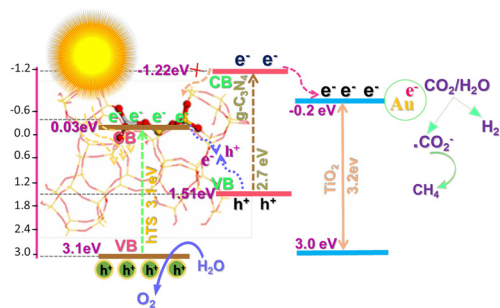
Xueyan Hou, Ye Bian, Lijian Jin and Linjun Yang*



4729

Suitable energy avenue for the dimension-matched cascade charge transfer mechanism in a g-C₃N₄/TS-1 heterostructure co-doped with Au-TiO₂ for artificial photosynthetic green fuel production

Imran Khan, Salman Khan, Amir Zada,* Ahmed Ismail, Muhammad Ishaq Ali Shah, Muhammad Ateeq, Perveen Fazil, Javed Ali Khan, Afsar Khan, Farooq Jan, Dilawar Farhan Shams, Baoji Miao, Sharafat Ali* and Shiliang Wang*



Fe-POM

supporting

calcination

supported FeO_x catalyst

CH_4 , O_2 , HCHO

Keiju Wachi, Tomohiro Yabe,* Takaaki Suzuki,
Kentaro Yonesato, Kosuke Suzuki
and Kazuya Yamaguchi*

The diagram illustrates the energy band structure and photocatalytic mechanism of the GaTe/PtS₂ heterojunction. The main part shows the conduction band (CB) and valence band (VB) for both materials, with the Fermi level (E_F) and internal electric field (E_{int}) indicated. The inset shows the crystal structures of GaTe and PtS₂, and the photocatalytic reactions: Reduction/H₂ and Oxidation/O₂.

Jiaxin Wang, Jinzhe Xuan, Xing Wei, Yan Zhang,
Jibin Fan, Lei Ni, Yun Yang, Jian Liu, Ye Tian,
Xugang Wang, Chongrong Yuan and Li Duan*

The diagram illustrates the photocatalytic cycle for H₂ evolution. A sun icon indicates light irradiation. The cycle involves a Cu(II) complex (top) and a Cu(I) complex (bottom). The Cu(II) complex is excited by light to a Cu(II)* state. This excited state undergoes electron transfer to TEOA, generating a Cu(I) complex and a TEOA radical cation (TEOA^{•+}). The Cu(I) complex then reduces H⁺ to H₂, regenerating the Cu(II) complex. The overall reaction is: 2H⁺ + 2TEOA → H₂ + 2TEOA^{•+}. The H₂ evolution rate is given as 931 μmol g⁻¹ h⁻¹.

Jun-Shuai Zhang, Wen-Chen Zhou, Jia-Yu Lai
and Wei-De Zhang*

Figure 1 consists of three panels. Panel (a) shows the crystal structure of P-doped LCO, a layered structure with La (green spheres), Co (blue spheres), P (yellow spheres), O (red spheres), and O vacancy (white circles) sites. Panel (b) shows the energy level diagram for the Co d-band center, with the P-doped LCO band at -1.78 eV and the LCO band at -2.18 eV. Panel (c) shows the DOS plot for LCO and P-doped LCO, with the P-doped LCO showing a higher density of states at the Fermi level.

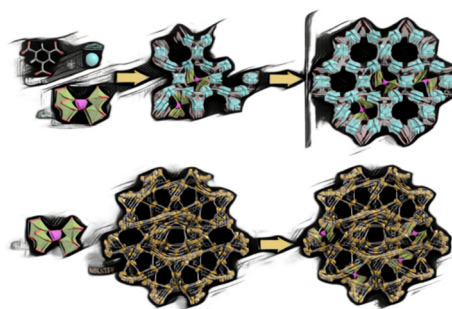
Ping Liang, Qina Yang, Fanping Kong, Zhida Liang,
Xuyao Niu, Yongjian Zhu, Chaoqun Ren, Xin He
and Chi Zhang*

PAPERS

4785

Peroxomolybdate@MOFs as effective catalysts for oxidative desulfurization of fuels: correlation between MOF structure and catalytic activity

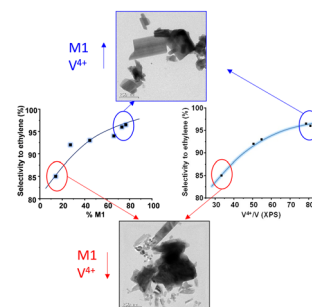
Yan Gao, Carlos M. Granadeiro, Luís Cunha-Silva, Jianshe Zhao* and Salette S. Balula*



4802

Upgrading the reflux method as novel route for competitive catalysts in alkane selective oxidation

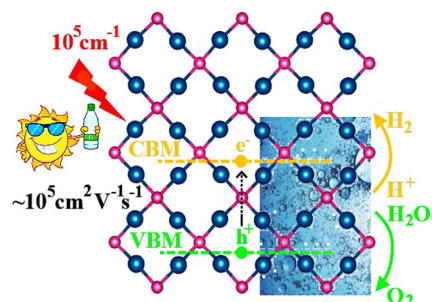
Amada Massó Ramírez, Agustín de Arriba, Francisco Ivars-Barceló, Adel Ykrelef, Benjamín Solsona* and José M. López Nieto*



4813

Forecasting the unrevealed surface-controlled photocatalytic water splitting in two-dimensional Ag_2Se with ultrafast carrier mobility: a first-principles study

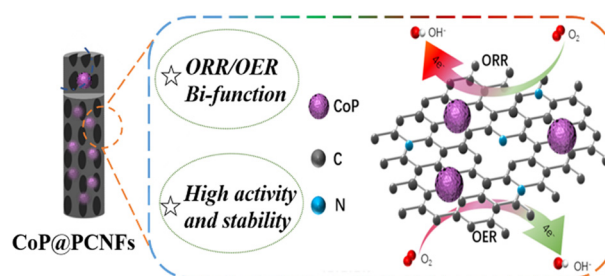
Yee Hui Robin Chang,* Keat Hoe Yeoh,* Junke Jiang, Soo See Chai, Yusuf Zuntu Abdullahi, Heng Yen Khong, Thong Leng Lim and Moi Hua Tuh



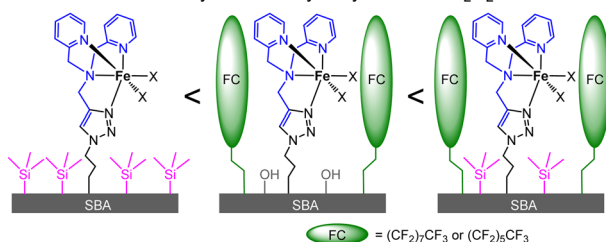
4823

CoP nanoparticles embedded in three-dimensional porous network-like structured N, O co-doped carbon nanofibers as an effective bi-functional electrocatalyst for rechargeable zinc-air batteries

Nanping Deng,* Qiang Zeng, Yang Feng, Hongjing Gao, Gang Wang, Jing Yan, Tinglu Zheng, Yong Liu,* Weimin Kang* and Bowen Cheng



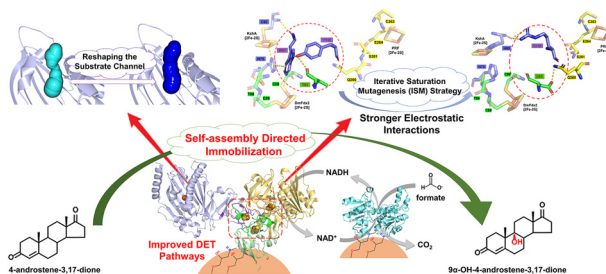
4839

Activity of alkane hydroxylation with H_2O_2 

Oxygenase mimicking immobilised iron complex catalysts for alkane hydroxylation with H_2O_2

Seiya Sakakura, Ryunosuke Kitamoto, Kazuki Goto, Seito Miura, Takamasa Takeda, Masaya Okamura, Arisa Fukatsu, Shinobu Itoh and Shiro Hikichi*

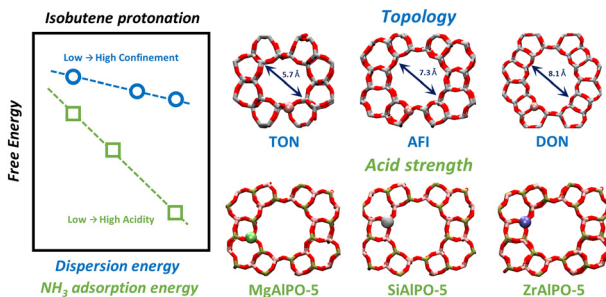
4847



Directed self-assembly strategy of a DET complex based on the application of artificial electron channeling

Zhan Song, Meijing Wei, Yinghao Fang, Fuping Lu, Minze Jia, Hui-Min Qin* and Shuhong Mao*

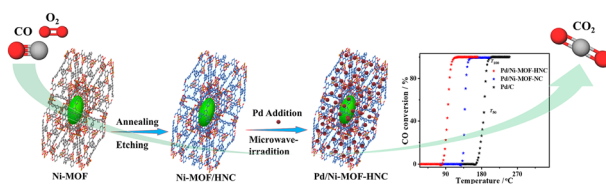
4857



Universal descriptors for zeolite topology and acidity to predict the stability of butene cracking intermediates

Pieter Cnudde, Michel Waroquier and Veronique Van Speybroeck*

4873



Pd nanocrystals encapsulated in MOF-derived Ni/N-doped hollow carbon nanosheets for efficient thermal CO oxidation: unveiling the effect of porosity

Adewale K. Ipadeola, Ahmed Gamal, Aboubakr M. Abdullah,* Aderemi B. Haruna, Kenneth I. Ozoemena* and Kamel Eid*

