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DALIAN INSTITUTE OF CHEMICAL PHYSICS, CHINESE ACADEMY OF SCIENCES



#### REVIEW

Haidong Zhao, Zhaochao Xu et al.  
Biomarker-targeted fluorescent probes for breast cancer imaging

#### COMMUNICATION

Fangjun Wang, Xiang Fang et al.  
Elucidating the various multi-phosphorylation statuses of protein functional regions by 193-nm ultraviolet photodissociation

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## Graphical Abstracts/Chin Chem Lett 29 (2018) iii-vi

## Perspective

## Biochemical reactions in metabolite-protein interaction

Wen Wang<sup>a,b,c</sup>, Dinesh Singh Tekcham<sup>a</sup>, Min Yan<sup>a,b,c</sup>, Zhichao Wang<sup>a,b,c</sup>, Huan Qi<sup>a</sup>, Xiaolong Liu<sup>a</sup>, Hai-Long Piao<sup>a,b</sup>

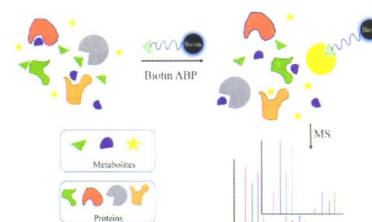
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An update on the recently developed chemical proteomics called activity-based protein profiling (ABPP) has been reviewed. ABPP is able to identify proteins interacted either covalently or non-covalently with metabolites significantly, which will facilitate the characterization of specific metabolite regulating proteins in human disease progression.

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## Reviews

## Biomarker-targeted fluorescent probes for breast cancer imaging

Dongfang Yue<sup>a,b</sup>, Meiling Wang<sup>a,b</sup>, Fei Deng<sup>b,c</sup>, Wenting Yin<sup>b</sup>, Haidong Zhao<sup>a</sup>, Xiaoming Zhao<sup>b</sup>, Zhaochao Xu<sup>b</sup>

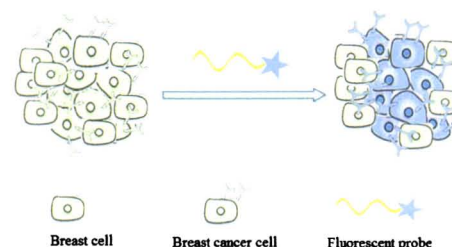
<sup>a</sup> The Second Affiliated Hospital of Dalian Medical University, Dalian 116023, China

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This review summarized fluorescent probes for breast cancer imaging according to different biomarkers probes recognized.

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## Rapid development in two-dimensional layered perovskite materials and their application in solar cells

Sajjad Ahmad<sup>a,b</sup>, Xin Guo<sup>a</sup>

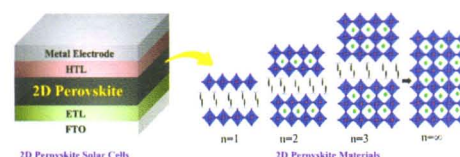
<sup>a</sup> State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences;

Dalian National Laboratory for Clean Energy, Dalian 116023, China

<sup>b</sup> University of Chinese Academy of Sciences, Beijing 100049, China

This review summarized recent research progresses of two-dimensional layered organic-inorganic hybrid perovskite materials and their photovoltaic performances in 2D perovskite solar cells.

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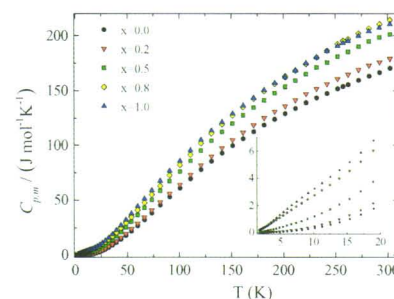
## Applications of low temperature calorimetry in material research

Xin Liu, Jipeng Luo, Nan Yin, Zhi-Cheng Tan, Quan Shi

Thermochemistry Laboratory, Liaoning Province Key Laboratory of Thermochemistry for Energy and Materials, Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

Low temperature calorimetry has been used not only to obtain heat capacity, entropy, enthalpy and Gibbs free energy, but also to investigate and understand lattice vibrations, metals, superconductivity, electronic and nuclear magnetism, dilute magnetic systems and structural transition involved in material research.

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## Species, engineering and characterizations of defects in TiO<sub>2</sub>-based photocatalyst

Beibei Dong<sup>a,b</sup>, Taifeng Liu<sup>c</sup>, Can Li<sup>a</sup>, Fuxiang Zhang<sup>a</sup>,

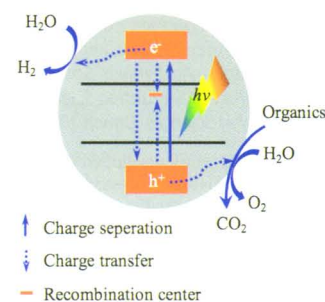
<sup>a</sup> State Key Laboratory of Catalysis, 2011-iChEM, Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Dalian 116023, China

<sup>b</sup> University of Chinese Academy of Sciences, Beijing 100049, China

<sup>c</sup> National & Local Joint Engineering Research Center for Applied Technology of Hybrid Nanomaterials, Collaborative Innovation Center of Nano Functional Materials and Applications of Henan Province, Henan University, Kaifeng 475004, China

This review gave a brief summary on the main species, engineering and characterizations of defects on the TiO<sub>2</sub>-realated model photocatalyst.

Chinese Chemical Letters 29 (2018) 671



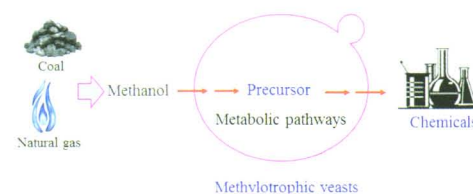
## Advances in engineering methylotrophic yeast for biosynthesis of valuable chemicals from methanol

Xingpeng Duan, Jiaoqi Gao, Yongjin J. Zhou

Division of Biotechnology, Dalian Institute of Chemical Physics, Chinese Academic Sciences, Dalian 116023, China

Methylotrophic yeasts, which can use methanol as carbon and energy source, have been widely used as microbial cell factories for biomanufacturing. Methanol derived from diverse sources could be transformed into precursor, such as pyruvate and acetyl-CoA, for the production of valuable chemicals through genetic engineering of methylotrophic yeast.

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## Non-metallic gold nanoclusters for oxygen activation and aerobic oxidation

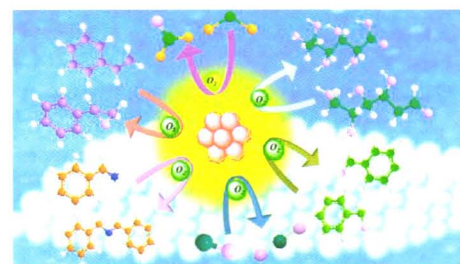
Guomei Zhang<sup>a</sup>, Ruru Wang<sup>a,b</sup>, Gao Li<sup>b</sup>

<sup>a</sup> School of Chemistry and Chemical Engineering, Shanxi University, Taiyuan 030006, China

<sup>b</sup> State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

In this review, oxygen activation and their aerobic oxidation over the Au nanoclusters are presented. The size-specificity, ligand engineering, and doping effects and the proposed reactions' mechanism and the structure-activity relationships at the atomic level are also discussed.

Chinese Chemical Letters 29 (2018) 687





## Communications

### Elucidating the various multi-phosphorylation statuses of protein functional regions by 193-nm ultraviolet photodissociation

Zheyi Liu<sup>a</sup>, You Jiang<sup>b</sup>, Chunlei Xiao<sup>c</sup>, Xingchuang Xiong<sup>b</sup>, Tao Wang<sup>c</sup>, Jinan Li<sup>a</sup>, Fangjun Wang<sup>a</sup>, Xiang Fang<sup>b</sup>, Xueming Yang<sup>c</sup>

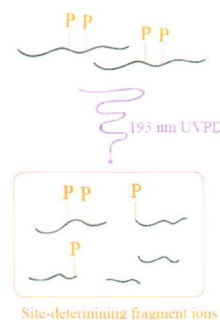
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<sup>b</sup> National Institute of Metrology, Beijing 100013, China

<sup>c</sup> State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

The 193-nm ultraviolet photodissociation strategy could significantly improve the MS ability in elucidating the confused phosphorylation sites with multiple possible positions due to its ability in generating more phosphorylation site-determining ions and providing higher sequence coverage.

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### Carrier dynamics in CsPbI<sub>3</sub> perovskite microcrystals synthesized in solution phase

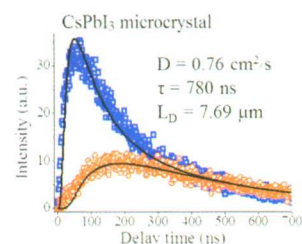
Jinwen Hu<sup>a,b</sup>, Chunyi Zhao<sup>b</sup>, Sheng He<sup>b</sup>, Wenming Tian<sup>b</sup>, Ce Hao<sup>a</sup>, Shengye Jin<sup>b</sup>

<sup>a</sup> State Key Laboratory of Fine Chemicals, Dalian University of Technology, Panjin 124221, China

<sup>b</sup> State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

Carrier diffusion and recombination kinetics in all-inorganic CsPbI<sub>3</sub> perovskite microcrystals directly synthesized in solution phase are reported.

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### Aptamer based fluorescent probe for serum HER2-ECD detection: The clinical utility in breast cancer

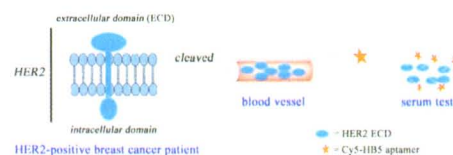
Meiling Wang<sup>a,b</sup>, Dongfang Yue<sup>a,b</sup>, Qinglong Qiao<sup>b</sup>, Lu Miao<sup>b</sup>, Haidong Zhao<sup>a</sup>, Zhaochao Xu<sup>b</sup>

<sup>a</sup> The Second Affiliated Hospital of Dalian Medical University, Dalian 116023, China

<sup>b</sup> Key Laboratory of Separation Science for Analytical Chemistry, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

HB5 aptamer-based probe has been developed for serum HER2-ECD test in auxiliary clinical diagnosis and treatment for HER2-positive breast cancer patients.

Chinese Chemical Letters 29 (2018) 703



### Radiofrequency field enhanced chemical ionization with vacuum ultraviolet lamp for miniature time-of-flight mass spectrometer

Lijuan Zhou<sup>a</sup>, Jichun Jiang<sup>b</sup>, Kun Zhao<sup>b</sup>, Jinxu Li<sup>b</sup>, Chenxin Wu<sup>b,c</sup>, Haiyang Li<sup>b</sup>, Di Tian<sup>a</sup>, Keyong Hou<sup>b</sup>

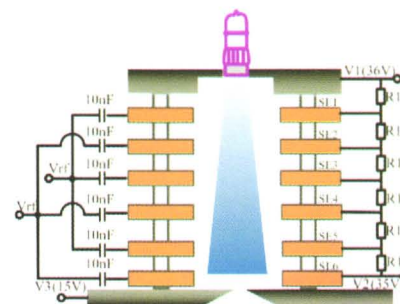
<sup>a</sup> College of Instrumentation & Electrical Engineering, Jilin University, Changchun 130023, China

<sup>b</sup> Key Laboratory of Separation Science for Analytical Chemistry, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

<sup>c</sup> University of Chinese Academy of Sciences, Beijing 100039, China

Radiofrequency field enhanced chemical ionization enhances the sensitivity of benzene, toluene, hydrogen sulfide and other compounds by 2–3 orders of magnitude and expanded the detection range of the compounds with ionization energy from 10.6 eV to 12.0 eV.

Chinese Chemical Letters 29 (2018) 707



## Tailoring thermal conductivity of bulk graphene oxide by tuning the oxidation degree

Qing-Long Meng<sup>a</sup>, Hengchang Liu<sup>a,b</sup>, Zhiwei Huang<sup>a,c</sup>, Shuang Kong<sup>a,c</sup>, Peng Jiang<sup>a</sup>, Xinhe Bao<sup>a</sup>

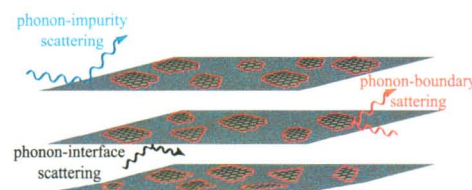
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<sup>b</sup> School of Physical Science and Technology, ShanghaiTech University, Shanghai 200031, China

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The thermal conductivity of graphene oxides can be tailored by tuning oxidation degree due to the introduction of atomic- and nano-scale phonon scattering centers.

Chinese Chemical Letters 29 (2018) 711



## A non-aqueous Li/organosulfur semi-solid flow battery

Chenhui Wang<sup>a,c</sup>, Qinzhi Lai<sup>a</sup>, Pengcheng Xu<sup>a</sup>, Xianfeng Li<sup>a,b</sup>, Huamin Zhang<sup>a,b</sup>

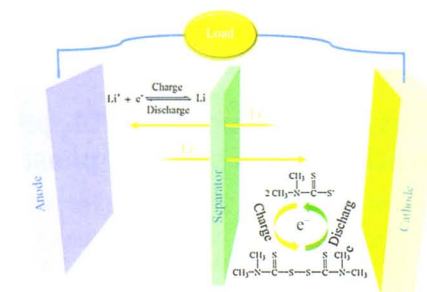
<sup>a</sup> Division of energy storage, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

<sup>b</sup> Collaborative Innovation Centre of Chemistry for Energy Materials (iChEM), Dalian 116023, China

<sup>c</sup> University of Chinese Academy of Sciences, Beijing 100039, China

A non-aqueous Li/organosulfur semi-solid flow battery is constructed. The battery with a high cell voltage of 3.36 V achieves coulombic efficiency of 99%, voltage efficiency of 73% and energy efficiency of 72% at the current density of 5 mA/cm<sup>2</sup>.

Chinese Chemical Letters 29 (2018) 716



## Cholesterol modulating the orientation of His17 in hepatitis C virus p7 (5a) viroporin – A molecular dynamic simulation study

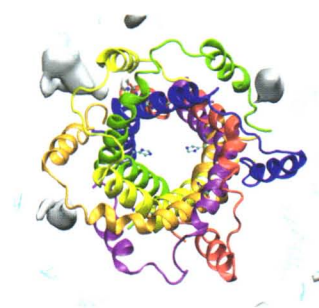
Yuebin Zhang<sup>a</sup>, Xiangda Peng<sup>a</sup>, Hong Ren<sup>b</sup>, Huiying Chu<sup>a</sup>, Yan Li<sup>a</sup>, Guohui Li<sup>a</sup>

<sup>a</sup> State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

<sup>b</sup> Aerospace Center Hospital, Beijing 100049, China

The cholesterol molecules interact with p7 channel between the adjoint H3 helixes, resulting in prominent conformational changes of these helical segments, which further exerts influence on the His17 residues of i + 2 monomer, leading to the residues facing towards the lumen of the pore. Such side chain orientations of His17 are considered to be essential for the channel's ionic selectivity and gating.

Chinese Chemical Letters 29 (2018) 719



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