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## Latest and Hot Papers

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## 近期热点文章 Latest and Hot Papers

### Origin of Stabilization and Destabilization in Solid-State Redox Reaction of Oxide Ions for Lithium-Ion Batteries

N. Yabuuchi, M. Nakayama, M. Takeuchi, S. Komaba, Y. Hashimoto, T. Mukai, H. Shiiba, K. Sato, Y. Kobayashi, A. Nakao, M. Yonemura, K. Yamanaka, K. Mitsuhashi, T. Ohta

*Nature Commun.* DOI:10.1038/ncomms13814

报道了一种可利用氧离子变价提高容量、且在锂嵌入脱过程保持结构稳定的锂离子电池正极材料  $\text{Li}_3\text{NbO}_4\text{-LiMeO}_2$  (Me = Fe, Mn and V), 可逆容量达  $300 \text{ mAh}\cdot\text{g}^{-1}$ .

### Electrochemistry of Corroles in Nonaqueous Media

Y. Fang, Z. Ou, K. M. Kadish

*Chem. Rev.* DOI:10.1021/acs.chemrev.6b00546

关于卟咯类 (Corroles) 化合物在非水介质中的电化学行为的综述, 引用了 256 篇参考文献.

### Observation of Multipeak Collision Behavior during the Electro-Oxidation of Single Ag Nanoparticles

S. M. Oja, D. A. Robinson, N. J. Vitti, M. A. Edwards, Y. Liu, H. S. White, B. Zhang

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b11143

实验观察单个 Ag 纳米粒子在 Au 微电极表面的随机碰撞, 以及电荷转移过程.

### Constructing Hierarchical Tectorum-Like $\alpha\text{-Fe}_2\text{O}_3/\text{PPy}$ Nanoarrays on Carbon Cloth for Solid-State Asymmetric Supercapacitors

L. Wang, H. Yang, X. Liu, R. Zeng, M. Li, Y. Huang, X. Hu

*Angew. Chem. Int. Ed.* DOI:10.1002/anie.201609527

在碳纸上构筑  $\text{Fe}_2\text{O}_3/\text{PPy}$  (聚吡咯) 纳米阵列电极, 具有  $382.4 \text{ mF}\cdot\text{cm}^{-2}@0.5 \text{ mA}\cdot\text{cm}^{-2}$  的比电容, 与  $\text{MnO}_2$  电极构成超级电容器, 能量密度与功率密度分别为  $0.22 \text{ mWh}\cdot\text{cm}^{-3}$  与  $165.6 \text{ mW}\cdot\text{cm}^{-3}$ .

### Optical Imaging of Phase Transition and Li-Ion Diffusion Kinetics of Single $\text{LiCoO}_2$ Nanoparticles during Electrochemical Cycling

D. Jiang, Y. Jiang, Z. Li, T. Liu, X. Wo, Y. Fang, N. Tao, W. Wang, H.-Y. Chen

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b08923

采用表面等离子共振显微术 (SPRM) 研究  $\text{LiCoO}_2$  单颗粒在电化学循环过程中的相变和锂离子扩散动力学.

### Transition Metal Dichalcogenide Atomic Layers for Lithium Polysulfides Electrocatalysis

G. Babu, N. Masurkar, H. A. Salem, L. M. R. Arava

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b08681

发现电极表面的 2 维过渡金属氯化物薄层可将液态的多硫化物催化转化为固态的硫化物, 从而提高锂硫电池正极的循环性能.  $0.5 \text{ C}$  倍率下 350 周循环容量保持在  $590 \text{ mAh}\cdot\text{g}^{-1}$ .

### Atomistic Mechanisms Underlying Selectivities in C1 and C2 Products from Electrochemical Reduction of CO on Cu(111)

H. Xiao, T. Cheng, W. A. Goddard

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b06846

量子力学计算研究 Cu(111) 表面 CO 电还原转化为甲烷和乙烯的机理. 发现电极表面的  $\text{H}_2\text{O}$  有利于生成碳氢化合物, 而不是含氧的醇类产物.

### Morphology-Directed Selective Production of Ethylene or Ethane from $\text{CO}_2$ on a Cu Mesopore Electrode

K. D. Yang, W. R. Ko, J. H. Lee, S. J. Kim, H. Lee, M. H. Lee, K. T. Nam

*Angew. Chem. Int. Ed.* DOI:10.1002/anie.201610432

通过调控介孔 Cu 电极的孔结构, 可有效提升  $\text{CO}_2$  电还原 C2 产物的选择性, 原因可能与孔道中的局部 pH 和中间产物的停留时间有关.

### Structural Descriptors of Zeolitic -Imidazolate Frameworks Are Keys to the Activity of Fe-N-C Catalysts

V. Armel, S. Hindocha, F. Salles, S. Bennett, D. Jones, F. Jaouen

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b11248

发现以金属有机框架化合物 ZIF-8 为前体制备的 Fe-N-C 催化剂的氧还原反应 (ORR) 催化活性与 ZIF-8 的腔体积存在正相关, 而与 ZIF-8 中的有机配体无关.

### Energy and Fuels from Electrochemical Inter-

**faces**

V. R. Stamenkovic, D. Strmcnik, P. P. Lopes, N. M. Markovic

*Nature Mater.* 16 (2017) 57.

关于电化学能量转化中的电催化基础的综述展望文章. 引用了 150 篇参考文献.

**Sustainability and *in Situ* Monitoring in Battery Development**

C. P. Grey, J. M. Tarascon

*Nature Mater.* 16 (2017) 45.

关于未来电池发展的展望综述文章. 引用了 112 篇参考文献.

**Achieving High-Performance Room-Temperature Sodium-Sulfur Batteries With S@Interconnected Mesoporous Carbon Hollow Nanospheres**

Y.-X. Wang, J. Yang, W. Lai, S.-L. Chou, Q.-F. Gu, H. K. Liu, D. Zhao, S. X. Dou

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b08685

将介孔碳材料应用于钠硫电池正极,发现正极反应可在  $S_8$  和  $Na_2S_4$  之间循环. 理论容量  $418 \text{ mAh} \cdot \text{g}^{-1}$ , 200 周循环容量保持率约 88.8%.

**Through-Space Charge Interaction Substituent Effects in Molecular Catalysis Leading to the Design of the Most Efficient Catalyst of  $CO_2$ -to-CO Electrochemical Conversion**

I. Azcarate, C. Costentin, M. Robert, J.-M. Savéant

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b07014

合成了一系列 Fe 卟啉分子催化剂,其中苯基间位带季铵阳离子最有利于获得  $Fe^0$ -CO 加合物,对  $CO_2$  还原反应催化活性最高. 220 mV 极化下的 TOF 高达  $10^6 \text{ s}^{-1}$ , CO 产率 100%, 80 小时电解保持稳定.

**Biaxially Strained PtPb/Pt Core/Shell Nanoplate Boosts Oxygen Reduction Catalysis**

L. Bu, N. Zhang, S. Guo, X. Zhang, J. Li, J. Yao, T. Wu, G. Lu, J.-Y. Ma, D. Su, X. Huang

*Science* 354 (2016) 1410.

PtPb/Pt 核/壳纳米片催化剂,存在双轴张力效应,使暴露的 Pt(110)晶面对 ORR 表现出高的催化活性,  $0.9 \text{ V}_{\text{RHE}}$  下电流密度达  $4.3 \text{ A} \cdot \text{mg}_{\text{Pt}}^{-1}$ , 50000 周电势

循环扫描保持稳定.

**Ultrafine Jagged Platinum Nanowires Enable Ultrahigh Mass Activity for the Oxygen Reduction Reaction**

M. Li, Z. Zhao, T. Cheng, A. Fortunelli, C.-Y. Chen, R. Yu, Q. Zhang, L. Gu, B. V. Merinov, Z. Lin, E. Zhu, T. Yu, Q. Jia, J. Guo, L. Zhang, W. A. Goddard, Y. Huang, X. Duan

*Science* 354 (2016) 1410.

以 PtNi 合金纳米线为前体,通过电化学去合金化获得粗糙化的 Pt 纳米线,电化学比表面达  $118 \text{ m}^2 \cdot \text{g}_{\text{Pt}}^{-1}$ . 对 ORR 表现出极高的催化活性,  $0.9 \text{ V}_{\text{RHE}}$  下电流密度达  $13.6 \text{ A} \cdot \text{mg}_{\text{Pt}}^{-1}$ , 6000 周电势循环扫描保持稳定.

**All the Catalytic Active Sites of  $MoS_2$  for Hydrogen Evolution**

G. Li, D. Zhang, Q. Qiao, Y. Yu, D. Peterson, A. Zafar, R. Kumar, S. Curtarolo, F. Hunte, S. Shannon, Y. Zhu, W. Yang, L. Cao

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b05940

发现  $MoS_2$  催化碱性介质氢析出反应 (HER) 的活性除了与边沿 S 位点有关,还与 S 空位的密度有关,当 S 空位密度为 7-10% 时性能最优,尤其是对于结晶度高的  $MoS_2$ .

**Direct Superassemblies of Freestanding Metal - Carbon Frameworks Featuring Reversible Crystalline-Phase Transformation for Electrochemical Sodium Storage**

B. Kong, L. Zu, C. Peng, Y. Zhang, W. Zhang, J. Tang, C. Selomulya, L. Zhang, H. Chen, Y. Wang, Y. Liu, H. He, J. Wei, X. Lin, W. Luo, J. Yang, Z. Zhao, Y. Liu, J. Yang, D. Zhao

*J. Am. Chem. Soc.* DOI:10.1021/jacs.6b10782

碳包覆的 Sb 等金属,储 Na 容量高达  $246 \text{ mAh} \cdot \text{g}^{-1}$ , 7.5 C 倍率循环 5000 周容量 100% 保持.

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