

近期热点文章 Latest and Hot Papers

A Highly Reversible Room-Temperature Lithium Metal Battery Based on Crosslinked Hairy Nanoparticles

S. Choudhury, R. Mangal, A. Agrawal, L. A. Archer
Nature Commun. DOI: 10.1038/ncomms10101

采用交联的凝胶电解质,可有效抑制金属锂枝晶的生长,室温下金属锂负极循环超过 100 周,但电极容量较低,金属负极的优点没有体现.

Highly Durable and Active PtFe Nanocatalyst for Electrochemical Oxygen Reduction Reaction

D. Y. Chung, S. W. Jun, G. Yoon, S. G. Kwon, D. Y. Shin, P. Seo, J. M. Yoo, He. Shin, Y.-H. Chung, H. Kim, B. S. Mun, K.-S. Lee, N.-S. Lee, S. J. Yoo, D.-H. Lim, K. Kang, Y.-E. Sung, T. Hyeon

J. Am. Chem. Soc. DOI: 10.1021/jacs.5b09653

通过多巴胺热分解在 PtFe 金属间化合物纳米颗粒表面包覆 1 nm 厚的氮杂碳层,此催化剂对氧还原反应(ORR)表现出优异的催化活性和稳定性.

Nanosized IrO_x-Ir Catalyst with Relevant Activity for Anodes of Proton Exchange Membrane Electrolysis Produced by a Cost-Effective Procedure

P. Lettenmeier, L. Wang, U. Golla-Schindler, P. Gazdzicki, N. A. Cañas, M. Handl, R. Hiesgen, S. S. Hosseiny, A. S. Gago, K. A. Friedrich

Angew. Chem. Int. Ed. DOI: 10.1002/anie.201507626

通过在含表面活性剂的非水介质中还原 IrCl₃,获得对氧析出反应(OER)催化活性比 Ir 黑高 5 倍的纳米 Ir 催化剂,用于质子交换膜水电解器.

Li₂C₂, a High-Capacity Cathode Material for Lithium Ion Batteries

N. Tian, Y. Gao, Y. Li, Z. Wang, X. Song, L. Chen

Angew. Chem. Int. Ed. DOI: 10.1002/anie.201509083

研究了 Li₂C₂ 碳化锂作为锂离子电池正极材料的可行性,理论容量达 1400 mAh·g⁻¹,实际有一半的锂离子可以脱出,但由于材料的电子与离子电导率小,导致充放电的电势差较大.

Single Layer Graphene Encapsulating Non-Precious Metals as High-Performance Electrocatalysts for Water Oxidation

X. Cui, P. Ren, D. Deng, J. Deng, X. Bao

Energy Environ. Sci. DOI: 10.1039/C5EE03316K

在介孔硅中合成单层石墨烯包覆 3d 金属纳米颗粒 M@C,其中 FeNi@C 对碱性介质 OER 表现出优于 Ir 催化剂的活性.

In Situ Observation of Active Oxygen Species in Fe-Containing Ni-Based Oxygen Evolution Catalysts: The Effect of pH on Electrochemical Activity

B. J. Trzesńniewski, O. Diaz-Morales, D. A. Vermaas, A. Longo, W. Bras, M. T. M. Koper, W. A. Smith

J. Am. Chem. Soc. DOI: 10.1021/jacs.5b06814

运用 Raman 与 X 射线吸收光谱研究碱性 OER 镍基催化剂的构效关系,发现 NiOO⁻可能是 OER 的活性中间态,由 NiOOH 脱氢形成,碱性条件可促进此过程.文章还分析了 Fe 杂质的影响.

Correlating Microstructural Lithium Metal Growth with Electrolyte Salt Depletion in Lithium Batteries Using ⁷Li MRI

H. J. Chang, A. J. Illott, N. M. Trease, M. Mohammadi, A. Jerschow, C. P. Grey

J. Am. Chem. Soc. DOI: 10.1021/jacs.5b09385

运用 ⁷Li 磁共振方法研究金属锂电极的枝晶生长,发现电沉积前期出现苔藓状结构,随着表面电解液层锂离子浓度的降低,枝晶开始出现.

Operando Analysis of NiFe and Fe Oxyhydroxide Electrocatalysts for Water Oxidation: Detection of Fe⁴⁺ by Mössbauer Spectroscopy

J. Y. C. Chen, L. Dang, H. Liang, W. Bi, J. B. Gerken, S. Jin, E. E. Alp, S. S. Stahl

J. Am. Chem. Soc. DOI: 10.1021/jacs.5b10699

运用 Mössbauer 谱研究碱性 OER 的 NiFe 催化剂,发现在氧析出过程中,NiFe 层状氢氧化物有约 20%的 Fe 为 +4 价,但 Fe 氧化物却没有.

Ultrathin Co₃O₄ Layers Realizing Optimized CO₂ Electroreduction to Formate

S. Gao, X. Jiao, Z. Sun, W. Zhang, Y. Sun, C. Wang, Q. Hu, X. Zu, F. Yang, S. Yang, L. Liang, J. Wu, Y. Xie

Angew. Chem. Int. Ed. DOI: 10.1002/anie.201509800

制备了超薄 Co₃O₄ 原子层,由于具有高的电导率和

活性位点密度,对 CO₂ 电还原具有高的催化效率,甲酸产率 60%可持续 20 h.

C and N Hybrid Coordination Derived Co-C-N Complex as a Highly Efficient Electrocatalyst for Hydrogen Evolution Reaction

Z.-L. Wang, X.-F. Hao, Z. Jiang, X.-P. Sun, D. Xu, J. Wang, H.-X. Zhong, F.-L. Meng, X.-B. Zhang
J. Am. Chem. Soc. DOI: 10.1021/jacs.5b09021

发现氮杂碳材料含少量 Co(0.22 at%),可大幅提示其对氢析出反应的催化活性,100 mA·cm⁻² 的电流密度下,电势极化为 0.2 V.

“Water-in-Salt” Electrolyte Enables High-Voltage Aqueous Lithium-Ion Chemistries

L. Suo, O. Borodin, T. Gao, M. Olguin, J. Ho, X. Fan, C. Luo, C. Wang, K. Xu
Science 350 (2015) 938.

发现使用高浓度的锂离子水溶液,锂离子电池的电势窗口可达 3 V,用于实现电压为 2.3 V 的水溶液锂离子电池,高倍率或低倍率循环 1000 周,库仑效率保持 100%.

Identical Location Transmission Electron Microscopy Imaging of Site-Selective Pt Nanocatalysts: Electrochemical Activation and Surface Disorder

R. M. Arán-Ais, Y. Yu, R. Hovden, J. Solla-Gullóon, E. Herrero, J. M. Feliu and H. D. Abrunña
J. Am. Chem. Soc. DOI: 10.1021/jacs.5b09553

采用原位透射电子显微术(TEM)研究 Pt 纳米颗粒在电势循环(< 1.3 V)过程中的形貌变化,发现 25 周的循环可使 Pt 颗粒的形态显著变化.这是电势循环条件下 Pt 粒子运动最直接的观察.

Single-Crystalline Ultrathin Nickel Nanosheets Array from *in Situ* Topotactic Reduction for Active and Stable Electrocatalysis

Y. Kuang, G. Feng, P. Li, Y. Bi, Y. Li, X. Sun
Angew. Chem. Int. Ed. DOI: 10.1002/anie.201509616
制备了超薄 Ni 纳米片阵列电极,发现对肼氧化反应与 HER 具有高的催化活性.

Mesostructure-Induced Selectivity in CO₂ Reduction Catalysis

A. S. Hall, Y. Yoon, A. Wuttig, Y. Surendranath
J. Am. Chem. Soc. DOI: 10.1021/jacs.5b08259
发现提高 Au 多孔电极的厚度,对 HER 催化活性降低,但对 CO₂ 电还原的催化活性保持不变.优化的介孔结构可在 0.4 V 超电势下实现 CO 产率达 99%.

The Electrochemical Characterization of Single Core-Shell Nanoparticles

L. R. Holt, B. J. Plowman, N. P. Young, K. Tschulik, R. G. Compton
Angew. Chem. Int. Ed. DOI: 10.1002/anie.201509008
报道了一种利用 Au 和 Ag 的氧化还原活性差异表征 Au@Ag 核壳结构纳米颗粒的方法,与电子显微的表征结果相吻合.

Conductivity-Dependent Completion of Oxygen Reduction on Oxide Catalysts

D.-G. Lee, O. Gwon, H.-S. Park, S. H. Kim, J. Yang, S. K. Kwak, G. Kim, H.-K. Song
Angew. Chem. Int. Ed. DOI: 10.1002/anie.201508129
研究了电子电导率对钙钛矿类 ORR 催化剂的活性影响,发现通过提高碳含量,可使反应更接近 4 电子过程.

Polyethylenimine Promoted Electrocatalytic Reduction of CO₂ to CO in Aqueous Medium by Graphene-Supported Amorphous Molybdenum Sulphide

F. Li, S.-F. Zhao, L. Chen, A. Khan, D. R. MacFarlane, J. Zhang
Energy Environ. Sci. DOI: 10.1039/C5EE02879E
将无定形硫化钼 MoS_x 负载在聚乙烯亚胺(PEI)修饰的还原石墨烯氧化物(rGO)上,对 CO₂ 还原为 CO 表现出高选择性. PEI 与 MoS_x 之间可能存在催化协同效应.

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