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Reviews

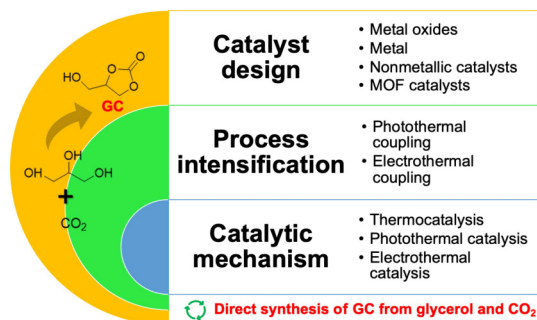
Research on the direct synthesis of glycerol carbonate from carbon dioxide and glycerol

Dan Yang*, Yating Wu, Yiwen Zhao, Yifei Wang, Chunmei Zhou, Yihu Dai, Xiaoyue Wan, Yuguang Jin, and Yanhui Yang*

This review highlights recent progress about direct synthesis of glycerol carbonate from carbon dioxide and glycerol in the view of both the catalyst design and the process intensification, which provides some feasible strategies for catalyst preparation and process intensification to promote the catalytic properties.

Carbon Future, **2025**, 2, 9200031

<https://doi.org/10.26599/CF.2025.9200031>



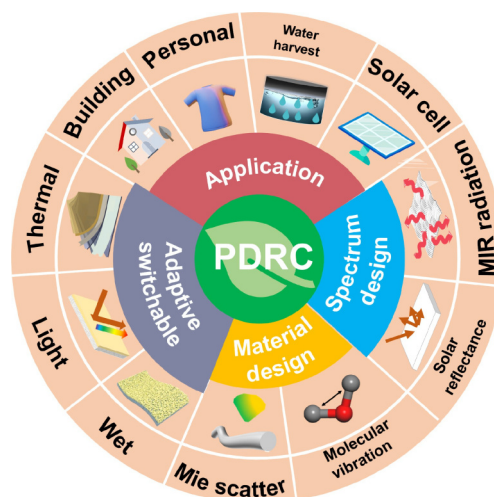
Progress in passive daytime radiative cooling from spectral design to real application

Zhuojing Zhao, Siming Zhao, Jiaqi Xu, Xueke Wu, Zhenyu Guo, Ya Huang, and Rufan Zhang*

Passive daytime radiative cooling (PDRC) is an attracting energy-saving cooling technology taking outer space as natural cold sink, however, there is still a gap between PDRC concept and practical application. In this review, we summarize the progress from spectral design in PDRC and provide practical guidelines for real and specific scenarios, aiming to provide a guideline for further development.

Carbon Future, **2025**, 2, 9200033

<https://doi.org/10.26599/CF.2025.9200033>



Research articles

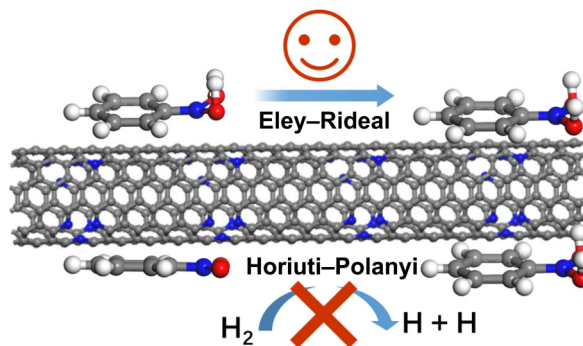
Unveiling the Eley–Rideal mechanism: H₂ activation for nitrobenzene hydrogenation on nitrogen-doped carbon nanotubes

Hongquan Fu, Kuntao Huang, Jialong Zhang*, Yonghai Cao, Hongjuan Wang, Hejun Gao, Yunwen Liao, Shuang Li, and Hao Yu*

The hydrogenation of nitrobenzene catalyzed by nitrogen-doped carbon materials tends to follow the Eley–Rideal (ER) mechanism rather than the Horiuti–Polanyi (HP) mechanism.

Carbon Future, **2025**, 2, 9200028

<https://doi.org/10.26599/CF.2025.9200028>



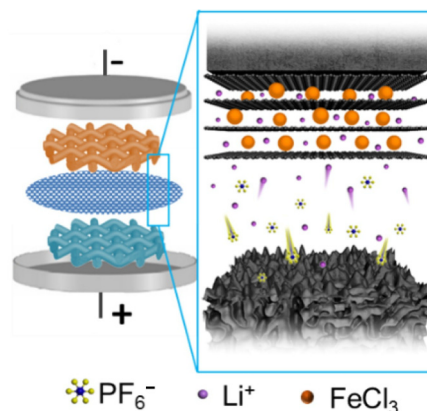
High performance Li-ion capacitor achieved by rational design of carbon cloth based intercalated anode and porous cathode

Jiang Deng*, Haiyan Wang, and Yong Wang*

The aligned graphitic layers in free-standing carbon cloth can reduce the tortuosity, and the expanding lattice endows faster ion-diffusion kinetics and leads to high-rate capability in terms of Li-ion capacitors.

Carbon Future, **2025**, 2, 9200030

<https://doi.org/10.26599/CF.2025.9200030>



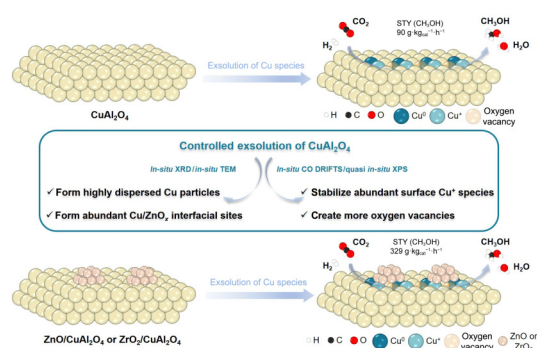
Customizing copper structure via controlled exsolution of CuAl_2O_4 for enhanced CO_2 hydrogenation to methanol

Xiaohang Sun, Jingpeng Zhang, Yue Pan, Gang Lin, Zhengwen Li, Dong Su, and Binhang Yan*

This work proposes a unique reduction exsolution strategy based on CuAl_2O_4 spinel to significantly enhance the structural tunability and catalytic performance of Cu-based catalysts. The systematic and comprehensive *in situ* characterizations reveal the mechanism of reduction exsolution strategy.

Carbon Future, **2025**, 2, 9200032

<https://doi.org/10.26599/CF.2025.9200032>



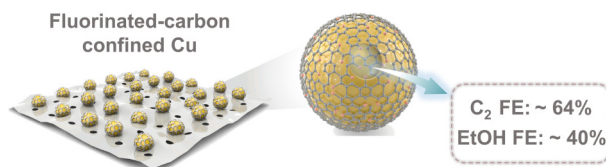
Cu nanoparticles embedded in fluorinated mesoporous carbon for enhanced CO_2 electroreduction to C_2 products

Yao Ma, Taishi Xiao, Kerun Zhu, Dongyuan Zhao, and Wei Li*

Fluorinated-carbon confined Cu catalysts in the two-dimensional (2D) mesoporous carbon framework are synthesized via a bottom-up interfacial assembly strategy, which deliver a > 64% C_2 products selectivity in the electrochemical CO_2 reduction.

Carbon Future, **2025**, 2, 9200034

<https://doi.org/10.26599/CF.2025.9200034>

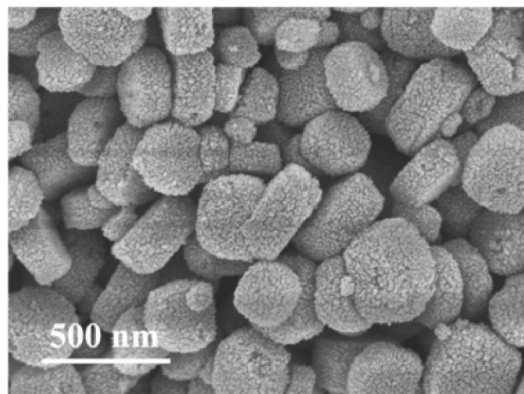


MOF-derived 3D hierarchical porous $\text{TiO}_2\text{@NPC@S}$ as high-performance cathodes for Li-S batteries

Peng Shi, Chengyao Zhu, Chuxin Chen, Ying Luo, Feng Sun, Xuan Du, Tao Zhou, and Guo Gao*

$\text{TiO}_2\text{@NPC@S}$ (NPC = nanoporous carbon) composites were successfully developed as high-performance cathodes for lithium-sulfur batteries. The $\text{TiO}_2\text{@NPC@S}$ cathodes demonstrate outstanding long-term cycling performance, and exhibit a high initial capacity of 1327.35 mAh/g at 0.5 C.

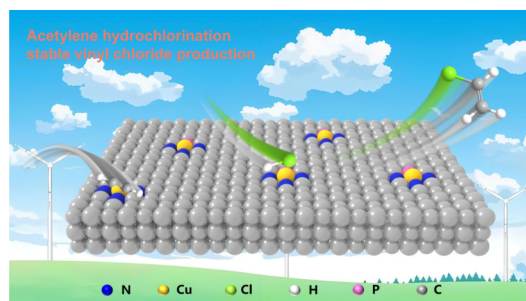
Carbon Future, **2025**, 2, 9200035
<https://doi.org/10.26599/CF.2025.9200035>

**Asymmetric $\text{Cu}_1\text{-N}_3\text{-P-C}$ active centers for efficient acetylene hydrochlorination**

Yuxiang Bao, Xiuhui Zheng, Chang Liu, Xing Lv, Yinming Guo, Baorui Li, Jianlin Cao, Yujie Gao, Juncong Yuan, Mengxin Wang, Zhe Ma, Yongxiao Tuo, Hao Yan, Lina Li*, Yibin Liu, Xiaobo Chen, Xiang Feng*, Chaohe Yang, and De Chen*

We used an innovative approach to integrate phosphorus into the nitrogen-doped carbon framework and introduced the single copper center to form the asymmetric structure $\text{Cu}_1\text{-N}_3\text{-P-C}$. As a result, we developed the novel copper-nitrogen-phosphorus-carbon (Cu-NPC) catalyst for the acetylene hydrochlorination.

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