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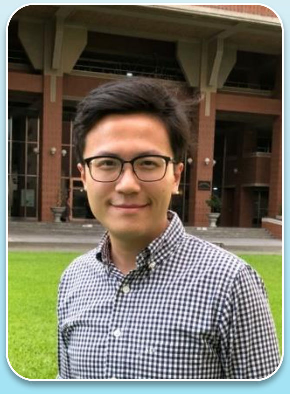


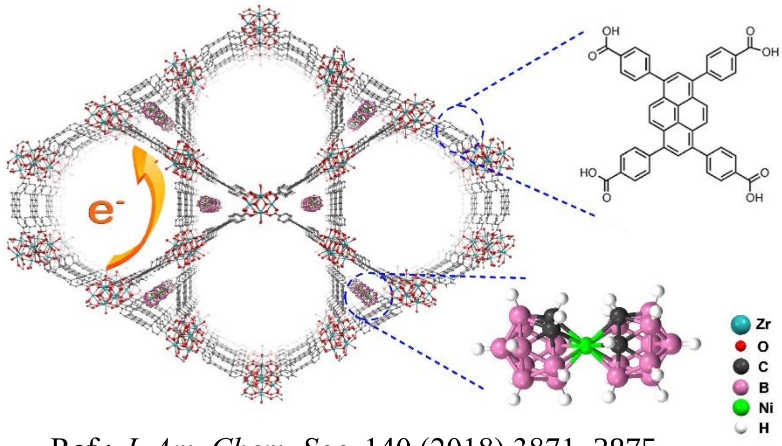
Research Interests

The research in our group focuses on the design and synthesis of advanced porous materials, such as metal-organic frameworks (MOFs), MOF-based nanocomposites and relevant inorganic oxides, for a range of electrochemical applications including charge storage, solar-to-fuel conversion process, electrochromic devices, and electrochemical sensors.

Representative Publications

1. **C. W. Kung**, K. Otake, C. T. Buru, S. Goswami, Y. Cui, J. T. Hupp, A. M. Spokoyny, and O. K. Farha*, *J. Am. Chem. Soc.*, 140 (2018) 3871–3875.
2. **C. W. Kung**, C. O. Audu, A. W. Peters, H. Noh, O. K. Farha*, and J. T. Hupp*, *ACS Energy Lett.*, 2 (2017) 2394–2401.
3. **C. W. Kung**, Y. S. Li, M. H. Lee, S. Y. Wang, W. H. Chiang*, and K. C. Ho*, *J. Mater. Chem. A*, 4 (2016) 10673–10682.
4. **C. W. Kung**, J. E. Mondloch, T. C. Wang, W. Bury, W. Hoffeditz, B. M. Klahr, R. C. Klet, M. J. Pellin, O. K. Farha*, and J. T. Hupp*, *ACS Appl. Mater. Interfaces*, 7 (2015) 28223–28230.
5. **C. W. Kung**, T. H. Chang, L. Y. Chou, J. T. Hupp, O. K. Farha, and K. C. Ho*, *Electrochem. Commun.*, 58 (2015) 51–56.
6. **C. W. Kung**, Y. H. Cheng, C. M. Tseng, L. Y. Chou, and K. C. Ho*, *J. Mater. Chem. A*, 3 (2015) 4042–4048.
7. **C. W. Kung**, T. H. Chang, L. Y. Chou, J. T. Hupp, O. K. Farha, and K. C. Ho*, *Chem. Commun.*, 51 (2015) 2414–2417.
8. **C. W. Kung**, Y. H. Cheng, and K. C. Ho*, *Sens. Actuators, B*, 204 (2014) 159–166.
9. **C. W. Kung**, H. W. Chen, C. Y. Lin, Y. H. Lai, R. Vittal, and K. C. Ho*, *Prog. Photovoltaics*, 22 (2014) 440–451.
10. **C. W. Kung**, T. C. Wang, J. E. Mondloch, D. Fairen-Jimenez, D. M. Gardner, W. Bury, J. M. Klingsporn, J. C. Barnes, R. Van Duyne, J. F. Stoddart, M. R. Wasielewski, O. K. Farha*, and J. T. Hupp*, *Chem. Mater.*, 25 (2013) 5012–5017.
11. **C. W. Kung**, Y. H. Cheng, H. W. Chen, R. Vittal, and K. C. Ho*, *J. Mater. Chem. A*, 1 (2013) 10693–10702.
12. **C. W. Kung**, C. Y. Lin, R. Vittal, and K. C. Ho*, *Sens. Actuators, B*, 182 (2013) 429–438.
13. **C. W. Kung**, H. W. Chen, C. Y. Lin, K. C. Huang, R. Vittal, and K. C. Ho*, *ACS Nano*, 6 (2012) 7016–7025.
14. **C. W. Kung**, H. W. Chen, C. Y. Lin, R. Vittal, and K. C. Ho*, *J. Power Sources,* 214 (2012) 91–99.
15. **C. W. Kung**, C. Y. Lin, Y. H. Lai, R. Vittal, and K. C. Ho*, *Biosens. Bioelectron.*, 27 (2011) 125–131.

Electrically conductive MOFs for charge storage

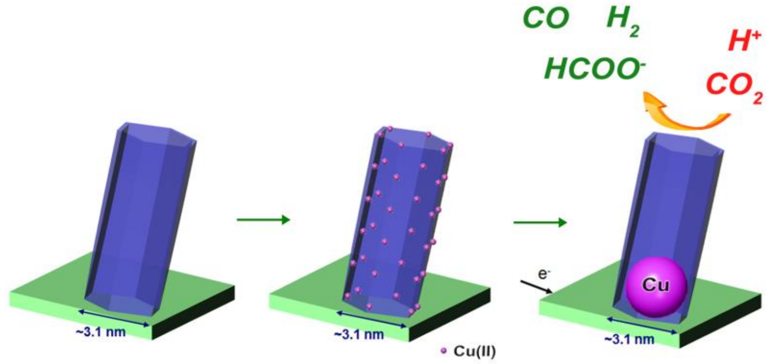


Ref.: *J. Am. Chem. Soc.* 140 (2018) 3871–3875.

Introducing donor-acceptor complex renders the design of water-stable electrically conductive MOF with a high surface area of >1,200 m^2/g and mesoporosity. After the post-synthetic installation of manganese oxide nanoclusters, the framework exhibits excellent capacity for charge storage.

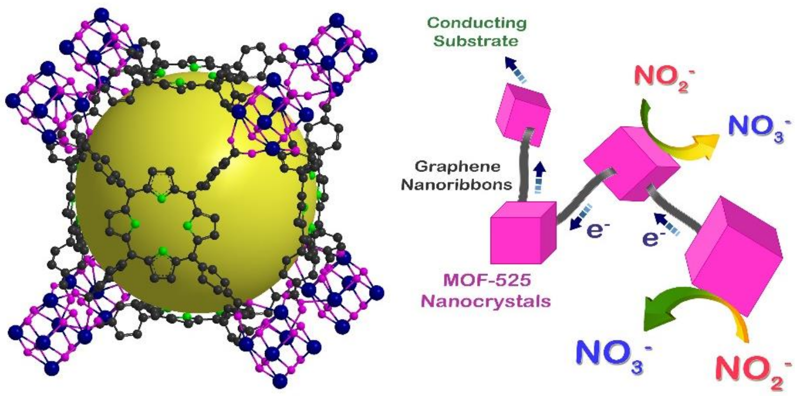
Electrode design for solar-to-fuel conversion

Metallic copper nanoparticles with a uniform size of 3-4 nm can be prepared by using MOF thin films as the template. The framework prevents the aggregation of nanoparticles, and the obtained electrode can convert CO_2 to useful fuels electrochemically.



Ref.: *ACS Energy Lett.* 2 (2017) 2394–2401.

MOF-based nanocomposites for electrochemical sensors

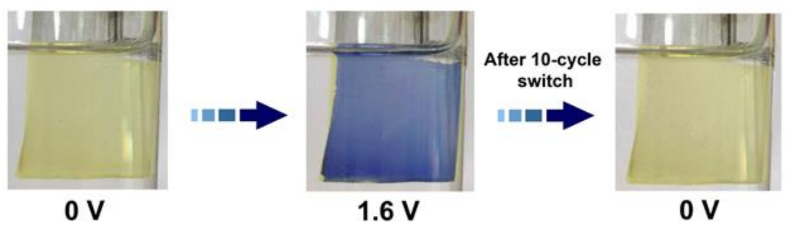


Ref.: *J. Mater. Chem. A*, 4 (2016) 10673–10682.

Nanocomposites with graphene nanoribbons (GNRs) and nanocrystals of an electrochemically active MOF were designed. The GNRs act as conducting bridges to enhance the charge transport through the MOF crystals, which results in a much more enhanced sensitivity in the use of electrochemical nitrite sensor.

Electrochromic porous materials

The design of MOFs with spatially separated pyrene units prevents the dimerization of pyrene radical cations, which results in a significant and reversible electrochromic behavior.



Ref.: *Chem. Meter.* 25 (2013) 5012–5017.