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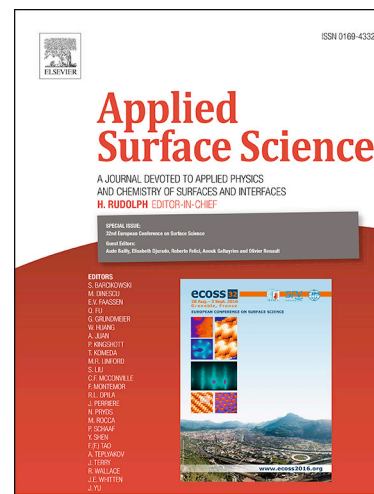
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**Non-noble metal@carbon nanosheet derived from exfoliated MOF
crystal as highly reactive and stable heterogeneous catalyst**

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Abstract: Metal-organic framework (MOF) materials have exhibited a wide range of application as heterogeneous catalyst or catalyst precursor. However, the catalytic activity of many micro-sized or big block MOFs usually was limited by mass transfer resistance and low percentage of exposed active site. Herein, we report a novel strategy to prepare high-efficiency non-noble metal nanocatalysts via the exfoliation of stromatolithic MOF crystal combined subsequent carbonization process. First, micro-sized Cu- or Zn-containing MOF (Cu- or Zn-MOF) was synthesized by the coordination bonds between metal ion precursor and organic ligand. Subsequently, an exfoliated process was carried out to harvest MOFs nanosheets by H₃PO₄ molecules selective diffusion and etching between the MOFs crystal layer. Cu or Zn nanoparticles embedded by porous carbon (Cu@C or Zn@C) was finally obtained by the carbonization of Cu-MOF or Zn-MOF nanosheets in N₂ atmosphere, respectively. Cu@C and Zn@C nanosheets showed excellent catalytic activity and reusability toward the reduction of 4-nitrophenol and organic dyes. Such enhanced performance could be attributed to the high specific surface area, good dispersibility, fully exposed active sites, and the synergistic effect of metal NPs and carbon. The strategy presented herein can give MOFs great potential for application in the treatment of environmental wastewater.

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