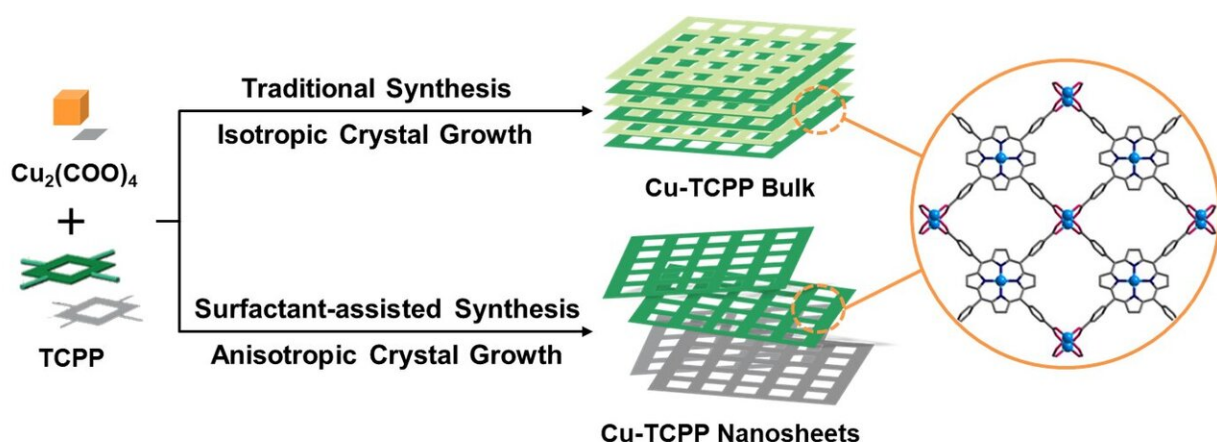


# Novel metal-organic framework nanosheets developed for anticorrosive coating

December 2 2020, by Liu Jia



The preparation of MOF nanosheets via traditional vs. surfactant-assisted methods. Credit: NIMTE

The marine functional materials group led by Prof. Wang Liping at the Ningbo Institute of Materials Technology and Engineering (NIMTE) of the Chinese Academy of Sciences (CAS), has successfully prepared ultrathin metal-organic framework (MOF) nanosheets via surfactant-assisted bottom-up method.

The developed two-dimensional (2-D) MOF nanosheets enhanced anticorrosion properties of composite coatings. This study was published in *Corrosion Science*.

As a vital branch of 2-D material, organic framework material has attracted increasing interest. However, water poses a serious threat to its structure, which significantly influences the stability of material in the metal protection field.

To address this issue, the research group at NIMTE synthesized MOF nanosheets with excellent water stability, by virtue of adding polyvinylpyrrolidone (PVP) as the surfactant to achieve the pre-assembly and coordination between  $\text{Cu}_2^+$  ions and porphyrin ligands.

The obtained ultrathin nanosheets, with a thickness of 1~3 nm, showed more uniform scale and higher yield (57%) than those prepared through traditional liquid exfoliation methods.

In addition, the synthesized 2-D MOF nanosheets were applied as nanofillers into epoxy thermoset to improve its barrier performance against the corrosive media. Measurement results indicated that the prepared nanosheets can effectively prevent the [water](#) permeation, thus significantly improve anticorrosion properties of coatings for a wider range of practical applications.

This work paves the way for the research and development of materials and devices in relevant fields, such as photocatalysis and gas separation.

**More information:** Shihui Qiu et al. Ultrathin metal-organic framework nanosheets prepared via surfactant-assisted method and exhibition of enhanced anticorrosion for composite coatings, *Corrosion Science* (2020). [DOI: 10.1016/j.corsci.2020.109090](https://doi.org/10.1016/j.corsci.2020.109090)

Provided by Chinese Academy of Sciences

Citation: Novel metal-organic framework nanosheets developed for anticorrosive coating (2020, December 2) retrieved 5 May 2024 from <https://phys.org/news/2020-12-metal-organic-framework-nanosheets-anticorrosive-coating.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.