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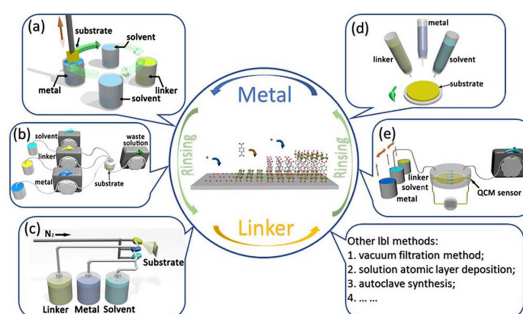
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Thin films made from metal-organic frameworks offer unique properties and useful characteristics with low-cost layer-by-layer fabrication.



Metal-organic frameworks (MOFs) are an emerging class of materials attracting attention for their extensive applications. They have been used in gas storage, energy harvesting, chemical synthesis, biomedicine, and many other fields. Increasingly, MOFs are being explored for applications in electronics and optoelectronics, which will require them to be manufactured as thin films.

Chen et al. explored the manufacturing process for surface-mounted MOFs (SURMOFs), which are promising candidates for thin-film applications. They discussed the manufacturing process for these materials and how the resulting properties have been exploited.

“More advanced applications of MOFs, such as in the fields of sensorics and electronic devices, are rapidly growing in importance,” said author Christof Wöll. “In this context, we felt it is timely to inform the community about a straightforward process to produce monolithic thin films from this material using a cheap method.”

SURMOFs are constructed using a layer-by-layer fabrication process, which provides greater control over the thickness of films when compared to traditional MOF fabrication methods. Using this manufacturing method allows for nanometer-scale control over the film thickness and precise control over its orientation. Programmed robot-based layer-by-layer assembly can further improve quality and create more complex layouts.

The authors provided an overview of several low-cost, straightforward layer-by-layer fabrication methods for SURMOFs and described how these materials can be used in several optic and electronic applications. They also discuss possibilities for future work.

“A new direction in this field involves the fabrication of thin films with nonlinear optical properties such as second harmonic generation,” said Wöll.

**Source:** “Layer-by-layer assembly of metal-organic framework thin films: Fabrication and advanced applications,” by Dong-Hui Chen, Hartmut Gliemann, and Christof Wöll, *Chemical Physics Reviews* (2023). The article can be accessed at <https://doi.org/10.1063/5.0135019>.

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