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 Creating & Controlling **Biointerfaces**
2016 Fall Lectureship Series ACS Publications
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Volume 90 Issue 43 | p. 35 | Concentrates
 Issue Date: October 22, 2012

Metal-Organic Framework Thin Films Made Easily

Speed and ease of two-step technique could enable applications of metal-organic frameworks

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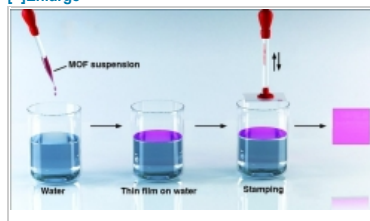
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Researchers have found a simple, fast way to make thin films of metal-organic frameworks, or MOFs (*J. Am. Chem. Soc.*, DOI: [10.1021/ja307953m](#)). The two-step technique allows chemists to control the film thickness and could work with many types of MOFs. Current methods for producing these films are time-consuming and aren't compatible with MOFs that require harsh synthesis conditions, says Hiroshi Kitagawa, a chemist at Kyoto University, in Japan. He and his colleagues developed a new method to make thin films of MOFs containing copper and a porphyrin. The team started by preparing the MOF particles in *N,N*-diethylformamide and ethanol. Next, they dispersed the

resulting MOF flakes in acetone or ethanol and then dripped the resulting suspension onto the surface of water in a beaker to produce a thin film. They transferred the layer to a solid substrate and repeated the process to create a film of desired thickness. In 10 minutes, the researchers could stack 100 layers of MOF sheets. By contrast, the traditional method took them 10 minutes to produce a single layer.

Chemical & Engineering News
 ISSN 0009-2347
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To make thin films of metal organic frameworks, researchers drip a suspension of MOF flakes in an organic solvent (red solution in dropper) onto the surface of water in a beaker (left). The flakes spread out on the water's surface to produce a thin film (second from left). The researchers then use a rubber stamp to transfer the film from the beaker (second from right) to a quartz substrate.

Credit: J. Am. Chem. Soc.

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