

Porous crystals from the vapor phase: MOF-CVD

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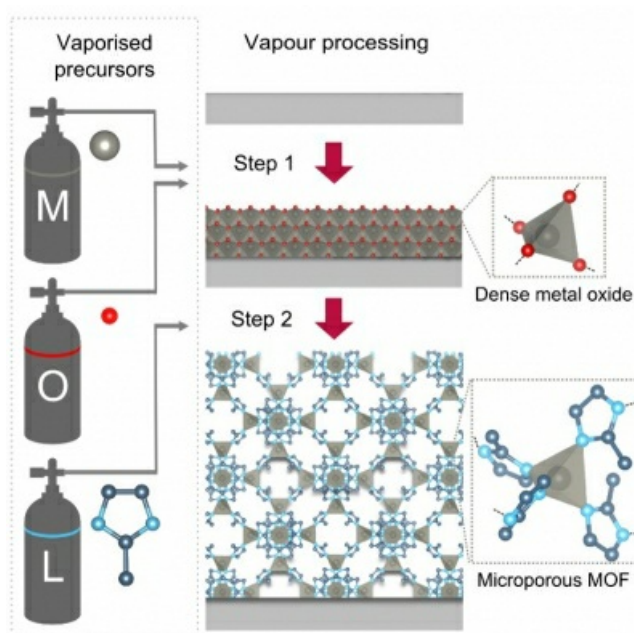
Metal-organic frameworks (MOFs) are an intriguing class of porous crystalline materials with record internal surface areas. There is tremendous potential for integrating MOFs into microelectronics, e.g. as active sensor coatings, low-k dielectrics and tunable conductors.[1] A key enabling step in leveraging the properties of MOFs in microelectronics will be the development of robust thin film deposition methods. Thus far, typical procedures for the deposition of MOF thin films are incompatible with microelectronic fabrication because of corrosion and contamination issues.

We recently demonstrated chemical vapor deposition (CVD) of MOF thin films.[2] The MOF-CVD process allows conformal growth of thin films and extends MOF processing to one of the most commonly used techniques in thin film research and manufacturing. Two important challenges were tackled to realize this process: vapor phase supply of precursors and crystallization at the vapor-solid interphase. To our knowledge, this is the first vapor phase process for conformal film deposition of a crystalline and microporous network material. Future directions and potential applications of MOF-CVD coatings will be discussed.[3]

[1] Allendorf, M. D., Schwartzberg, A., Stavila, V. & Talin, A. A. (2011) *Chemistry - A European Journal* 17, 11372–11388.

[2] Stassen, I., Styles, M., Greci, G., Van Gorp, H., Vanderlinden, W., De Feyter, S., Falcaro, P., De Vos, D. E., Vereecken, P. & Ameloot, R. (2016). *Nature Materials*, 15, 304–310.

[3] Stassen, I., De Vos, D. & Ameloot, R. (2016) *Chemistry – A European Journal*, 22, 14452–14460.



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