

Prof. Roland. A. Fischer

*Chair of Inorganic and Metal-Organic Chemistry and Catalysis Research Centre
Technical University Munich, Ernst-Otto-Fischer-Strasse 1
D-85748 Garching, Germany
roland.fischer@tum.de*

Integration of Metal-Organic Frameworks to Devices

Venerdì 13 settembre 2019, ore 11

Aula A «Nasini», Dipartimento di Scienze Chimiche, Via Marzolo 1 - Padova

Metal-Organic Frameworks (MOFs) are crystalline and (potentially) porous coordination network materials which are composed of metal ion building units connected by organic linkers via coordination bonds. MOFs feature a wide range of fascinating structures, and offer unique opportunities of molecular materials design and a huge parameter space of fine tuning of chemical and physical properties. Potential fields of MOF applications include energy, environment, health and information technologies. Thus, MOF research is connecting and bridging disciplines. Already in 2005, we pioneered MOF integration to devices by investigating MOF crystallite and thin film deposition and selective positioning to substrate surfaces.[1] Within the past decade, this particular area of MOF materials research has seen a tremendous evolution.[2,3] The lecture summarizes this development. Furthermore, it will highlight important aspects of MOF integration to devices based on MOF thin film growth techniques.

New perspectives will be discussed such as vapor-phase assisted growth being compatible with Chemical Vapor Deposition (CVD) and Atomic Layer Deposition (ALD) techniques known from microelectronic industry, and the coordination modulated quasi-epitaxial stepwise layer-by-layer growth in the liquid phase (CM-LPE) and the localized transformation of oriented ultrathin MOF thin films selectively into exceptionally high performing electrocatalytic coatings for water splitting.

References

- [1] S. Hermes, F. Schröder, R. Chelmowski, C. Wöll, R. A. Fischer, J. Am. Chem. Soc. 2005, 127
- [2] A. Bétard, R. A. Fischer, Chem. Rev. 2012, 112, 1055-1083.
- [3] K. Khaletskaya, J. Reboul, M. Meilikhov, M. Nakahama, S. Diring, M. Tsujimoto, S. Isoda, F. Kim, K. Kamei, R. A. Fischer, S. Kitagawa, S. Furukawa, J. Am. Chem. Soc. 2013, 135, 1099.
- [4] I. Stassen, N. Burtch, A. Talin, P. Falcaro, M. Allendorf, R. Ameloot, Chem. Soc. Rev. 2017, 46, 3185-3241.
- [5] S. Wannapaiboon, A. Schneemann, I. Hante, M. Tu, K. Epp, A.-L. Semrau, C. Sternemann, M. Paulus, G. Kieslich, R. A. Fischer, "Control of Structural Flexibility of Layered-Pillared Metal-Organic Frameworks Anchored at Surfaces", Nature Comm. 2019, 10, 346.

La presenza della S. V. sarà molto gradita.

Prof. Michele Maggini
Direttore del Dipartimento
di Scienze Chimiche



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Dipartimento di
Scienze Chimiche