The 104th iCeMS SEMINAR

Mon 02 Apr 2012
10:30-12:00

Surface-Templated Assembly of Functional Metal-Organic Frameworks

Lecturer: **Prof. Dr. Christof Wöll**
Karlsruhe Institute of Technology (KIT)

Venue: 2nd floor Seminar Room (#A207) Main Building
iCeMS Complex 1, Kyoto University

The fabrication of surface-anchored, crystalline, highly porous metal-organic frameworks (MOFs) on solid substrates using liquid-phase epitaxy (LPE) [1] opens the way to interesting applications in the area of sensorics, enantiomer separation, heterogeneous catalysis and electrochemistry [2]. We will demonstrate the LPE-principle for the case of $[Cu_3(BTC)_2]_n$ (HKUST-1) grown on COOH- and OH-terminated self-assembled monolayers (SAMs). SPR (surface plasmon resonance) spectroscopy has been used to monitor the growth in-situ [3]. XRD data reveal the formation of highly ordered, oriented crystalline MOF thin films with a structure identical to that observed in the bulk [4]. Recent results on electrochemical properties of SURMOFs will be discussed [5].

[1] O. Shekhah, H. Wang, S. Kowarik, F. Schreiber, M. Paulus, M. Tolan, Ch. Sternemann, F. Evers, D. Zacher, R.A. Fischer, Ch. Wöll , *Step-by-Step Route for the Synthesis of Metal-Organic Frameworks,* J. Am. Chem. Soc. **129**, 15118-15119 (2007)
[2] O. Shekhah, J. Liu, R. A. Fischer, Christof Wöll, *MOF thin films: existing and future applications,* Chem. Soc. Rev., **40**, 1081-1106 (2011)
[3] O. Shekhah, H. Wang, D. Zacher, R. A. Fischer, Ch. Wöll *Growth mechanism of metal-organic frameworks: Fundamental insights into the nucleation by employing a step-by-step route,* Angew. Chem. Int. Ed., **48**, 5038-5041 (2009)
[4] O.Shekah, H. Wang, M. Paradinas, C. Ocal, B. Schüpbach, A. Terfort, D. Zacher, R.A. Fischer, Ch. Wöll, *Controlling Interpenetration in Metal-Organic Frameworks by Liquid Phase Epitaxy,* Nature Materials, **8**, 481-484 (2009)
[5] A. Dragässer, O. Shekhah, O. Zybaylo, C. Shen, M. Buck, Ch. Wöll, D. Schlettwein, *Redox mediation enabled by immobilised centres in the pores of a metal-organic framework grown by liquid phase epitaxy*, Chem. Comm., **48**, 663-665 (2012)

Contact: iCeMS Kitagawa Lab at kitagawa-g@icems.kyoto-u.ac.jp
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