

Symposium:

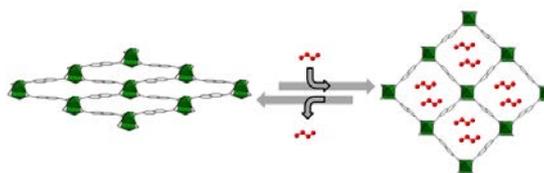
## Switchability in Porous Metal-Organic Frameworks

Date: March 13<sup>th</sup>-14<sup>th</sup>, 2017, TU Dresden, Germany

Start: March 13<sup>th</sup>, 2017 / 9 a.m.

End: March 14<sup>th</sup>, 2017/ 3 p.m.

Chair: S. Kaskel



Organizing Committee: E. Brunner, A. Eychmüller, G. Seifert

### Contact:

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### Registration:

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### Scope:

Porous materials play a key role in gas and liquid phase separations, energy storage, as catalysts and for optical and chemical sensing. Metal-Organic Frameworks (MOFs) stand out among other porous materials due to their extremely high porosity and modular tunability. While the majority of porous solids (and MOFs) is *rigid*, a novel and unique class of *switchable* MOFs was discovered in recent years. These materials only open their pores dynamically, as a response to the presence of gases or liquids at a characteristic concentration associated with unprecedented, step-wise unit cell volume changes (more than 240 %) during gas uptake. Such *switchable MOFs* are able to specifically respond or even recognize certain types of molecular species by opening their pores, resulting in a step-wise change of physical (i.e. magnetism, optical density, bulk density, etc.) and chemical characteristics (catalytic activity, reactivity). Moreover, they reversibly close their pores in the absence of the respective species. A principle understanding of the dynamic phenomena in such materials would represent a unique technological basis for the design of switchable catalysts, filters, threshold sensors, or stimulus induced drug delivery by receptor systems with integrated key-lock functionality. However, so far the discovery of switchable MOFs (also named gating, or breathing MOFs) was essentially accidental but recently an increasing number of such compounds are being discovered. Currently, it is still impossible to rationally predict new switchable structures, because the underlying microstructural principles, responsible for such a high degree of flexibility, are not understood. For the technological development of switchable MOFs in separation, catalysis, or sensing, a fundamental understanding of the underlying structural principles and gas-solid interaction mechanisms is needed. The symposium primarily addresses the *fundamentals of porosity switching* phenomena in the solid state and the underlying principles. Experimental and theoretical approaches in order to derive a predictive model for framework flexibility will be presented, as well as parallelized physical characterization tools will be established enabling the application of *in situ* global scattering techniques (XRD) and *in situ* local probe spectroscopies (NMR, EPR, EXAFS) in order to analyze the microscopic structural transformations and dynamics induced by host/guest interactions during adsorption/desorption. Only an interdisciplinary discussion will promote this new field to develop a predictive framework for switchable MOFs fostering an intense cooperation of theoreticians, synthetic chemists, and physicists.

### **Invited Speakers (Confirmed)**

Prof. A. Kondo (Tokyo)

Prof. G. Maurin (Montpellier)

Prof. F. X. Coudert (Paris)

Prof. Jeff Long (Berkeley)

Prof. J. Senker (Bayreuth)

Prof. H. Krautscheid (Leipzig)

Prof. Tina Düren (Bath)

Prof. R. Matsuda (Nagoya)

### **Additional Speakers:**

E. Brunner (Dresden)

G. Seifert (Dresden)

S. Kaskel (Dresden)

R. A. Fischer (Munich)

R. Schmid (Bochum)

A. Pöpl (Leipzig)

Th. Heine (Leipzig)

I. Baburin (Dresden)

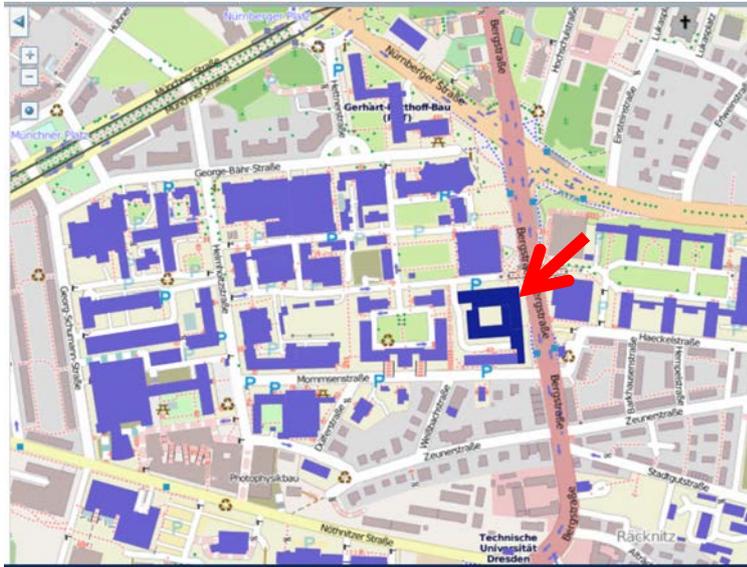
Jack Evans (Paris)

Supported by the TU Dresden Excellence program and DFG.

## Venue:

- **Neubau Chemische Institute: Bergstr. 66**

<https://navigator.tu-dresden.de/@13.73125706132908,51.02836259759001,16.z>



## **Hotels in Dresden:**

The university guest houses are convenient and can be booked by external guests without any financial disadvantage (they are operated as hotels financially independent from the university).

1. Gästehaus ‚Am Weberplatz‘:  
[https://tu-dresden.de/tu-dresden/campus/gaestehaeuser/am\\_weberplatz](https://tu-dresden.de/tu-dresden/campus/gaestehaeuser/am_weberplatz)
2. Gästehaus ‚Einsteinstraße‘:  
<https://tu-dresden.de/tu-dresden/campus/gaestehaeuser/einsteinstrasse>
3. NH Collection Dresden Altmarkt:  
[http://www.nh-hotels.de/hotels/dresden?gclid=CPjPzL\\_UI8wCFQccGwodXwYH-A&dclid=CPO217\\_UI8wCFZYTGWodwgUCYw](http://www.nh-hotels.de/hotels/dresden?gclid=CPjPzL_UI8wCFQccGwodXwYH-A&dclid=CPO217_UI8wCFZYTGWodwgUCYw)
4. Motel One Dresden am Zwinger:  
<http://www.motel-one.com/de/hotels/dresden/dresden-am-zwinger/>
5. Motel One Dresden am Palaisplatz:  
<http://www.motel-one.com/de/hotels/dresden/hotel-dresden-palaisplatz/>