

In situ metalation of porphyrins on metal and oxide surfaces



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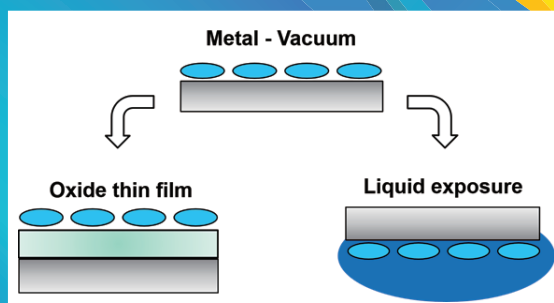
Physical Chemistry, University Erlangen-Nürnberg

Date & Time: 2019/3/26 (Tue.) 16:00-

Place: IMS Research Building Room 201

This colloquium will also be held as a Morino lecture.

Metallotetrapyrrole complexes are versatile functional building blocks in many biological and biochemical processes. In addition, these molecules are also utilized in technical applications, retaining their highly functional nature within an inorganic framework. Examples include gas sensors, solar cells and catalysts. In this presentation, the surface chemistry of porphyrins on metal and oxide substrates will be addressed. Specific topics are the interplay between porphyrin-substrate and porphyrin-porphyrin interactions, the role of the substrate, surface diffusion, and in particular the synthesis of metalloporphyrin monolayers by direct metalation of free base porphyrins, under UHV conditions and in the liquid phase.



References:

- M. Röckert, M. Franke, Q. Tariq, N. Jux, M. Stark, A. Kaftan, S. Ditze, H. Marbach, M. Laurin, J. Libuda, H.-P. Steinrück and O. Lytken, *Insights in the Reaction Mechanistics: Isotopic Exchange During the Metalation of Deuterated Tetraphenyl-21,23D-porphyrin on Cu(111)*, J. Phys. Chem. C 118 (2014) 26729–26736.
- M. Röckert, M. Franke, Q. Tariq, H.-P. Steinrück and O. Lytken, *Evidence for a Precursor Adcomplex During the Metalation of 2HTPP with Iron on Ag(100)*, Chem. Phys. Lett. 635 (2015) 60–62.
- M. Franke, F. Marchini, N. Jux, H.-P. Steinrück, O. Lytken, F. J. Williams, *Zinc Porphyrin Metal Center Exchange at the Solid-Liquid Interface*, Chem. Eur. J. 22 (2016) 8520–8524.
- D. Wechsler, M. Franke, Q. Tariq, L. Zhang, T.-L. Lee, P. Thakur, N. Tsud, S. Bercha, K. Prince, H.-P. Steinrück, O. Lytken, *Adsorption Structure of Cobalt Tetraphenylporphyrin on Ag(100)*, J. Phys. Chem. C 121 (2017) 5667–5674.
- M. Lepper, J. Köbl, T. Schmitt, M. Gurrath, A. de Siervo, M. A. Schneider, H.-P. Steinrück, B. Meyer, H. Marbach, W. Hieringer, *“Inverted” Porphyrins: a Distorted Adsorption Geometry of Freebase Porphyrins on Cu(111)*, Chem. Comm. 53 (2017) 8207–8210.
- D. Wechsler, C. C. Fernández, H.-P. Steinrück, O. Lytken, F. J. Williams, *Covalent Anchoring and Interfacial Reactions of Adsorbed Porphyrins on Rutile TiO₂(110)*, J. Phys. Chem. C 222 (2018) 4480–4487.
- M. Lepper, J. Köbl, L. Zhang, M. Meusel, H. Hölzel, D. Lungerich, N. Jux, A. de Siervo, B. Meyer, H.-P. Steinrück, H. Marbach, *Controlling the Self-Metalation Rate of Tetraphenylporphyrins on Cu(111) via Cyano Functionalization*, Angew. Chemie. Int. Ed. 57 (2018) 10074–10079.