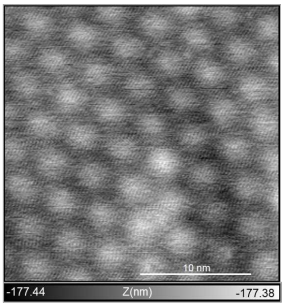
Master Thesis
6 months

Molecular adsorption on 2D MoS_2 islands gown on Au(111) surface

Introduction:

This master project is dedicated to the study of the system formed by porphyrins molecules and 2D molybdenum disulfide (MoS2) islands grown on Au(111) surfaces. In MoS2, the Mo layer is formed in between two S layers. This material present very interesting properties for electronic or tribological applications [1,2,3] and is a very active topic in research.

In the group, we recently implemented a system to prepare and investigate MoS2/Au(111) sample under UHV conditions. Here we will prepare the MoS2/Au(111) samples and evaporate porphyrin molecules on the surface. The interaction between molecules and MoS2 islands will be studied by tomic force microscopy in the non contact regime (ncAFM) allowing us to preform sub molecular resolution at room temperature as well as friction force microscopy (FFM) and kelvin probe force microscopy (KPFM).



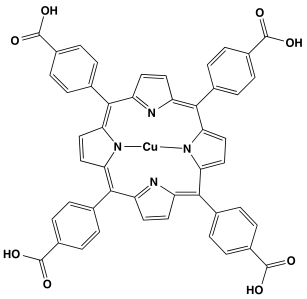


Figure: Left: ncAFM topography image of the Moiré formed by MoS2/Au(111).
Right: example scheme of a copper porphyrin.

Requirements:

Correct background in Physics.
The wish to learn experimental laboratory work.
High motivation and the ability to work independently.

What we offer:

Learn the most advanced AFM techniques in ultra high vacuum environment.
Interact with challenging experiments to grew 2D materials and image molecular/surface systems.
Learn basics in collecting, processing and analyzing data.
Personal supervision by researchers of the group of Prof. E. Meyer.

Bibliography:

[1] S. G. Sørensen et al., *ACS Nano*, 8, 2014, doi: 10.1021/nn502812n.
[2] N. Krane, et al., *Nano Lett.*, 16, 2016, doi: 10.1021/acs.nanolett.6b02101.
[3] A. Yousofnejad, et al., *Beilstein J. Nanotechnol.*, 11, 2020, doi: 10.3762/bjnano.11.91.

Contact to apply or for more information :

Dr Hinaut Antoine, office 3.04 antoine.hinaut@unibas.ch
Dr Thilo Glatzel, office 3.04 thilo.glatzel@unibas.ch
Prof Dr Ernst Meyer, ernst.meyer@unibas.ch