Review Report on PhD Thesis

Faculty: **Central European Institute of Technology**
Brno University of Technology in Brno

Academic year: **2020/2021**

Student: **Ing. Lukas Kormos**

Doctoral study program: **Advanced Materials and Nanosciences**

Field of study: **Advanced nanotechnologies and microtechnologies**

Supervisor: **doc. Ing. Jan Cechal, Ph.D.**

Reviewer**:** **prof. Dr. Uta Schlickum**

PhD thesis title: **2D molecular systems at surfaces**

Topicality of doctoral thesis:

The topic of this thesis, the investigation and understanding of 2D molecular networks at surfaces, is at the forefront of experimental investigations in the field of molecular self-assembly, also especially visible by the publications in ACS Nano and Nature Comm.

Meeting the goals set:

The candidate presents a well-written thesis including detailed experimental results and careful analysis of the data. The candidate presents an excellent experimental work combining different state of the art experimental techniques. The entire work is well embedded into literature, showing the broad knowledge of the candidate in the field of his research area.

Problem solving and dissertation results:

In the thesis, self-assembled structures of molecular networks on different substrates are carefully analyzed based on detailed experimental results. The candidate used several experimental techniques to manifest his conclusions. Beside STM and nc-AFM for the structural determination of the surface structures, he used as well several other techniques like LEEM, XPS, and ARPES. Combining the experimental data allowed the candidate to extract binding and coupling motives for the different molecular phases including insights into the electronic structures as well. This also includes the investigation of structural phase transitions.

Importance for practice or development of the discipline:

The results of the candidate significantly improve the knowledge in the field of 2D molecular network structures at surfaces. He studied several new combinations of organic molecules on different substrates. The combination of several experimental techniques allowed drawing conclusions on the atomically precise structure and binding motives.

Formal adjustment of the thesis and language level:

(4) The study is duly completed by a state doctoral examination and the defense of a dissertation, which proves the ability and readiness for independent activity in research or development or for independent theoretical and creative artistic activity. The dissertation must include original and published results or results accepted for publication.)

The thesis is well-written in English language.

Questions and comments:

The candidate handled in an excellent experimental thesis work.

Conclusion:

In my opinion, the reviewed thesis fulfill all requirements posed on theses aimed for obtaining PhD degree. This thesis is ready to be defended orally, in front of respective committee.

In Braunschweig, date 01.02.2021

prof. Dr. Uta Schlickum