

Brno University of Technology

Central European Institute of Technology BUT

Supervisor's report

Academic year: 2023/2024

Student: Michela Sanna

Doctoral program: Advanced Materials and Nanosciences

Supervisor: prof. RNDr. Martin Pumera, Ph.D.

Title of doctoral thesis: 2D materials for electrocatalysis and hydrogen generation as clean energy source

Overall evaluation of the doctoral thesis and study period of the doctoral student:

Michela Sanna has started her PhD studies in March 2020. Her PhD thesis is paper-based and focuses on studying novel layered 2D materials and their application for clean hydrogen production. In particular, the student aimed to investigate potential photoelectrocatalysts for utilization under the influence of visible light.

Research outputs:

- 6 publications in Q1 journals;
- Participation in national and international conferences with award for the best oral presentation;
- Principal Investigator of three student projects:
 1. Specific Research Project 2022 of CEITEC BUT, "Hybrid MXene-based electrode for photoelectrochemical water splitting" (CEITEC VUT-J-22-8084), **200.000 CZK**;
 2. Quality Internal Grant 2021 of the Brno University of Technology, "Modified 3D-printed electrodes with hybrid materials for the photoelectrochemical degradation of microplastics", **960.000 CZK** (2021-2023), OP RDE reg. no. CZ.02.2.69/0.0/0.0/19_073/00169483;

3. Winner of the Brno PhD Talent 2020 competition, "Organic functionalization of atomic layer deposited materials on 3D-printed electrodes for energy applications", 300.000 CZK (2020-2024).

- Fulfilling study requirements (seminars, courses) and passing the state doctoral exam in 2022 with a grade of A1 – excellent student;

- Internship abroad as visiting scholar for three months at the Molecular Materials Chemistry Lab at the Technical University of Wien, focused on developing hybrid electrodes and their application in carbon dioxide conversion.

During her PhD studies, she broadened her knowledge in photoelectrochemistry for hydrogen generation and expanded her skills in developing and modifying 3D-printed electrodes. She also gained experience in the characterization of 2D layered materials by using the equipment at CEITEC Nano facilities.

In my opinion, the reviewed thesis fulfills all requirements posed in theses aimed at obtaining a PhD degree. This thesis is ready to be defended orally in front of the respective committee. I recommend A grade for the thesis.

Brno, 15.04.2024

Signature