

THESIS EVALUATION SUPERVISOR EVALUATION

Author name: Ondřej Havelka

Supervisor: MSc. Rafael Omar Torres Mendieta, PhD.

Thesis title: Laser-generated synthesis of Pd-Ni nanoalloys usable as catalysts

- A. Abstract quality, keywords matching Excellent (1)
- B. Research scope and processing Excellent (1)
- C. Level of theoretical part Excellent (1)
- D. Appropriateness of the methods Excellent (1)
- E. Results elaboration and discussion Excellent (1)
- F. Students own contribution Excellent (1)
- G. The conclusion statement Excellent (1)
- H. Fulfillment of Thesis tasks (goals) Fulfilled
- I. Structure, correctness and fulness of references Excellent (1)
- J. Typographical and language level Excellent (1)
- K. Formal quality Excellent (1)
(text structure, chapters order, clarity of illustrations)
- L. Student access (independence, activity etc.) Excellent (1)

Comments, remarks:

The results of the current thesis will serve as seminal studies for publishing a scientific paper about the laser-mediated synthesis of Pd-Ni nanoalloys for their use as heterogeneous catalysts.

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Overall assessment:

In the current thesis, Ondřej worked on the laser-mediated synthesis of Pd-Ni nanoalloys and tested their catalytic performance. For this, he has used the technique known as "Reactive Laser Ablation in Liquids", which is based on the simultaneous ablation of a solid target immersed in a liquid and on the reduction of metal salts prompted by the liquid's interaction with a plasma generated due to the ablation process. The interaction between species coming from the ablation and those coming from the reduction resulted in forming an alloyed material that resembles a nickel core nanoparticle decorated by smaller palladium nanoparticles. The final material exhibited outstanding magnetic and catalytic properties. During the working process, Ondřej showed genuine interest and passion for the development and design of the experiments, and even when the continuous sanitary measures restricted the free use of the university's installments, his willingness to complete the current scientific project allowed us to achieve our main scientific objectives on time.

The difficulty of the topic was elevated for a master's student, but Ondřej successfully completed all the tasks related to the work.

The work performed herein is brand-new and may represent a cornerstone in understanding the laser-mediated precise control over the elemental composition of nanocatalysts. As mentioned above, Ondřej has a great interest in this research field. Thus, for his Ph.D. studies, he intends to continue exploring how to optimize the elemental composition of these materials and their incorporation in complex carbon-based structures for their exploitation in more ambitious catalytic reactions.

Questions for the defense:

No questions

Plagiarism checking:

Similarity by STAG: 0 % (see www.IS/STAG)

Comment if similarity is above 5 %:

The similarity is lower than 5%; thus, no plagiarism was detected.

Overall classification and recommendation:

Work meets the Master degree requirements and therefore I recommend it for the defense

I suggest to classify this work by grade: Excellent (1)

By signing I certify that I am not in any personal relationship with the author of the thesis

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Supervisor signature