

## HABILITATION THESIS REVIEWER'S REPORT

**Masaryk University**  
**Faculty**  
**Procedure field**  
**Applicant**  
**Applicant's home unit, institution**  
**Habilitation thesis**

Faculty of Science  
Analytical Chemistry  
**Mgr. Tomáš Vaculovič, Ph.D.**  
Department of Chemistry

**Reviewer**  
**Reviewer's home unit, institution**

**Laser ablation as a powerful tool for determination of elemental distribution**  
Univ.-Prof. Dipl.-Ing. Dr. techn. Thomas Prohaska  
Montanuniversität Leoben, Chair of General and Analytical Chemistry, Franz Josef Straße 18, 8700 Leoben

The submitted thesis of Mr. Vaculovič provides a profound insight in his outstanding research activities in the field of analytical chemistry. The major focus of the submitted habilitation thesis is laser ablation in combination with elemental mass spectrometry (namely, inductively coupled plasma mass spectrometry (ICP-MS)).

His record shows a more than 15 years of experience with laser ablation ICP-MS but also with optical emission spectroscopy and laser induced breakdown spectroscopy. Therefore, the candidate has developed a profound and internationally renowned expertise in the field of elemental surface analysis.

The thesis itself is pivoted around 16 research papers published between 2007 and 2020 presenting the development and application of LA-ICP-MS for the investigation of metallic, geological and biological materials. The thesis is well structured, providing a concise overview of the techniques and a summary of the state of the art and new developments in the different fields of research. The 16 articles show the variety of research accomplished. Besides fundamental research of the technology including novel methodological approaches which support the fundamental understanding of LIBS and LA-ICP-MS the papers cover a wide variety of applications providing a substantial insight in the capabilities of the researcher.

A substantial asset is that Mr. Vaculovič showed that the combination of different analytical methods is a substantial key prerequisite in order to enhance the understanding of material. The total work of Mr. Vaculovič is presented in 74 papers of which 67 are peer reviewed publications in the field. The research activities show that the candidate is an excellent researcher who understands to come up with new research questions and elaborate fundamental details in order to provide the substantial knowledge to accomplish applied research. As a prerequisite both the profound analytical knowledge but also the understanding of the other disciplines is the key for successful research. Once more, the candidate supports the substantial role of analytical chemistry in transdisciplinary research.

The number of publications in combination with the projects underlines the excellent activities of Mr. Vaculovič in the field. Above that, he proved to be a level-headed mind and an ambitious scientist. Mr. Vaculovič has also taken advantage of international collaborations and got international experience during internships at different institutions. Even though there is no

recent extended stay abroad, international collaborations and participations at international meetings show his important role in the international scientific community in the field.

As teaching is an important part of the responsibilities at a University it is important to underline that the candidate has a broad teaching experience in analytical chemistry. As a consequence, the candidate provides all necessary requirements for the applied promotion.

#### **Reviewer's questions for the habilitation thesis defence**

How would you rate the development in chemical imaging especially considering the immense increase of data and as a consequence the evaluation of different image data by combining different analytical techniques?

How would you rate developments of near field laser ablation ICP-MS which were presented 15 years ago?

What is to your opinion the major challenge in laser ablation ICP-MS?

#### **Conclusion**

After a thorough assessment of the habilitation thesis entitled **Laser ablation as a powerful tool for determination of elemental distribution** by **Mgr. Tomáš Vaculovič, Ph.D.** I can conclude that the **fulfils** all requirements expected of a habilitation thesis in the field of Analytical Chemistry.

Date:  
31.08.2020

Signature: