

To whom it may concern

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Dear Sir, Dear Madame,

I have carefully read the PhD thesis by Petr Víték 'Identification of microbial pigments in evaporites using Raman spectroscopy: implications for astrobiology' (Thesis supervisor: Jan Jehlička). This nicely written thesis starts with an extensive introduction, giving an overview of the research field. In the second part of the work, the candidate focusses on the Ramanspectroscopic analysis of microbial colonization of the Calcium sulphate crust of the Atacama desert. Petr Víték finishes the main part of his work with a general discussion and conclusions. In the appendices, 4 research papers are represented.

The work is nicely written, in a correct language and the author proves that he is able to express himself in a scientific way. The work is logically structured and the main aspects of this research are covered. The author makes a nice compilation

between his geological background and the spectroscopic work he has to perform on the other hand. Moreover, with this work Petr Víték proves that he is also able to discuss about biological issues – the way bacteria and lichens grow and protect themselves against harmful environments.

With this thesis, the author shows that he is able to perform good quality research in this domain. From my – mainly Raman spectroscopic – background I see different topics that can be risen during a discussion with the candidate. As far as I have seen him performing on international conferences, I am quite sure that he will be able to defend himself and to reason in a logic way, during a discussion with other scientists.

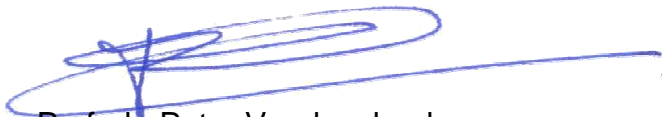
- One of these topics could include the selection of the most appropriate laser wavelength, for a future mission on Mars (Which are the changes that can be expected in a Raman spectrum, when changing the laser? What are the advantages/disadvantages of moving towards longer wavelengths (fluorescence, sensitivity ν^4 , etc.)? How is the sensitivity of the instrumentation changing in terms of laser wavelength? How about possible interferences? Etc.).

- Another point for a possible discussion could be how to design a suitable instrument for a mission to Mars (What are the requirements for such an instrument? How would you design the instrument (drilling or not)? What is the most difficult task in this context (finding where you have to record your spectrum)? What is the advantage/disadvantage of using time resolved Raman spectroscopy? Etc.).

- A last point I could rise as a possible point to think about is the definition of detection limits in Raman spectroscopy (How is classically a detection limit defined? What is the meaning of a detection limit for an inhomogeneous sample? What is the meaning of a detection limit on a micrometer scale? How many bands do you need to detect before you can be sure that a certain product is present? How big can the shift on the Raman shift be when you identify a product?)

Concluding, I can state that I really appreciate the work that was performed by the candidate, and I would like to congratulate Petr Vitek and his supervisor with the quality of this thesis!

Sincerely,



Prof. dr. Peter Vandenabeele
Professor in archaeometry
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