

## Posudek oponenta habilitační práce

Masarykova univerzita	
Fakulta	Přírodovědecká
Obor řízení	Fyzikální chemie
Uchazeč	Mgr. Dominik Heger, Ph.D.
Pracoviště uchazeče	Ústav chemie
Habilitační práce (název)	<i>Spektroskopické studie k objasnění interakcí látek na ledu a mechanismů fotochemických reakcí</i>
Oponent	prof. Dr. Martin Hof, DSc.
Pracoviště oponenta	Ústav fyzikální chemie J. Heyrovského AV ČR, v. v. i.

### Text posudku (rozsah dle zvážení oponenta) ...

The habilitation thesis of Dr. Dominik Heger consist of two independent scientific topics: A) Spectroscopic studies to explain the interactions of molecules on ice, and B) The investigation of mechanisms involved in selected photochemical reactions.

The first part is described in pages 9 till 27 and backed up by 9 original publications. According the author's statement publications 1, 5, 6, 7, 8, and 9 are the main papers (contribution at least  $\frac{1}{4}$ ) for the first part of the thesis. While it is apparent that in the first 5 publications Dr. Heger's contribution was to investigate the spectroscopic properties aromatic molecules on different surfaces (i.e. artificial snow grains, air-ice interface, ice surface, of small organic, ice grains), publication 9 deals with a quite different theme and experiment, the activity of an enzyme during freezing. The interpretation of the data in publications 1, 5, and 7 are based on computer simulations performed in a partner laboratory, publication 6 is a pure experimental one using mainly electron microscopy, and publication 8 is commentary. These 6 publications were published in respected international journals and the entire part represent a compact and interesting piece of scientific work.

The second part of the thesis is focussing on the photochemistry of different aromatic compounds. This part is described on pages 31 to 49 and is backed up by 14 publications. Here in 8 papers Dr. Heger contributed  $\frac{1}{4}$  or more to the publications. The main experimental contributions are spectroscopic measurements, with the majority being transient absorption spectroscopy. As already in the first part the publication appeared in in respected international journals, two of them even in a top chemical journal (i.e. Journal of American Chemical Society). In my opinion the second part is scientifically somewhat stronger than the first part, also reflecting the scientific experience of the two mentors of Dr. Heger, Prof. P. Klan and Prof. J. Wirz.

In summary I see this habilitation thesis as a comprehensive scientific piece of work of very good international standards. The core is formed by 14 good scientific papers and to those papers Dr. Heger contributed significantly. It is also apparent that with the time frame of 11 years Dr. Heger took more and more a dominant role in these publications: from 2011 till 2016 Dr. Heger is 6 times corresponding author and by that also formally the person who

initiated and coordinated the specific scientific piece of work. It is important for Dr. Heger's carrier that he also further develops his own scientific plans. Internationally a "habilitation thesis" is often connected with independent scientific work and in this respect this thesis pleases me much more than several other Czech habilitation thesis's I had to review before. Thus, I judge that this thesis clearly fulfils the requirements formulated by the "Masarykova Univerzita", and exceeds in terms of scientific independence of the author the usual Czech standards. Thus, I recommend to accept this thesis as a basis for the habilitation procedure.

**Dotazy oponenta k obhajobě habilitační práce (počet dotazů dle zvážení oponenta) ...**

I do have only have one questions: What are Dr. Heger's future plans?

**Závěr**

Habilitační práce Mgr. Dominik Heger, Ph.D. „Spektroskopické studie k objasnění interakcí látek na ledu a mechanismů fotochemických reakcí“ *splňuje* –požadavky standardně kladené na habilitační práce v oboru „Physical Chemistry“. [název oboru].

Prague, 6.2.2017