Opponency review of PhD thesis

Author: Ing. Miloslav Bělka

Dissertation topic: In vitro study of the effect of particle characteristics and flow rate on regional deposition in human airways

Opponent: doc. Ing. Vladimír Adamec, CSc.

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Submitted thesis

The content of PhD thesis is understandable, chronological and in context with requirements of this type of work. At first part is introduce the development of this issue from historical view and then is briefly introduce a problematic of respiratory airway physiology, aerosol deposition etc. In PhD thesis is very good prepared current state of the issue and there are compare the results of another actual researchers. Actuality of the PhD thesis is on high level related with current society requirements. Also allowing gets the new knowledge in this research area. The topic of PhD thesis also proposes another possible ways of research in different scientific disciplines (for example health risk assessment related with particle distribution, prevention, pharmaceutical aerosols and their characteristic, transport of particles etc.). There are two objectives in this PhD thesis. The first one focused on deposition of porous particles and the second one on deposition of fibrous particles. The both objective were investigated with appropriate methods and approaches with introduction of results and their explanation. These methods and approaches meet requirements on this type of research work. At the dissertation were apply methods for deposition and detection of porous and fibrous particles. Presented methods are adequate to the aims and meet possibilities of PhD student, current state of research knowledge and created the bases of related results.

The PhD student applied current research knowledge with appropriate literature review. The results continuously compares with another results of research works as is show in literature review. The knowledge has been applied to the experimental part. There have been applied methods for Deposition of porous particles and fibrous particles. The results have wide possibilities of application not only on theoretical base, but especially for the next research and application in practice. The conclusion related with authors results.

The dissertation contain wide spectrum of quality literature sources of research results related with the topic. There is possible show, that PhD student is able to work with foreign research results on high level.

Dissertation

The dissertation of Ing. Miloslav Bělka has proved that author has appropriate theoretical knowledge and practical skills in this issue. He is able to forms his own ideas with an appropriate presentation. The PhD student as author of dissertation is able of individual work and also in cooperation with another research institutes. The dissertation topic is very actual and related with current research in nanoparticles area. It is necessary to know possible risk related with distribution of ultrafine particles including nanoparticles, because the level of these risks is not well known and explore. The dissertation has met the stated objective where have been used the appropriate approaches and methods. Selected methods and approaches are presented at the captures 3 and 4. At the capture 5 are presented results of application selected methods. The procedure applied to problem solving related with stated objective and
met the requirements necessary for this type of research work. The importance for practice and another development of this issue in scientific discipline has been proved in connection with comment above. The results are useful for next research such as monitoring of health risk, risk level, possibilities of particles distribution etc. Author commented his results in cooperation with results of foreign author during the experimental part. Also, the author attached his scientific papers. Also, he introduce the future research focusing on deposition of fiber particles having large Stokes numbers and also open the possibility of research focused on deposition of polydisperse particles. The formal arrangement of dissertation and its linguistic level are on good level. There is a good processed the literature review including bibliographic citation (how is possible to see at pages 99-114). The terminology has been processed according requirements of terminology standards. The dissertation has been very good processed. There is not any significant discrepancy or errors and little wrongs, such as space or size of figures, do not reduce the quality of the work. Based on the evaluation above

I recommend the award of PhD academic degree to Ing. Miloslav Bělka.

Questions of opponent:

1) On the page 51 was written “The particle bulk and tapped density were not measured as the total volume of produced particles was too small to be determined”. How was the size of produced particles and why it wasn´t possible to determined them with using for example another instruments or methods?

2) On page 56 was written „The particles agglomerated during particle spraying and the proper solution for particle deagglomeration was not found.” Currently, do you have any idea for possible ways of deagglomeration?

Brno, May 29, 2018

Vladimir Adamec