

**Examiner's opinion on dissertation work****Autor: Dipl. Ing. et Ing. Kateřina Sulovská****Workplace: CPS, Thomas Bata University in Zlín****Supervisor: doc. Ing. Marián Lehocký, Ph.D.****Title of the work: "Preparation and characterisation of antibacterial surfaces"**

Dipl. Ing. et Ing. Kateřina Sulovská's dissertation work deals with preparation of active antibacterial surfaces based on low-molecular polyethylene treated with low-temperature plasma. Materials pre-treated in this manner were exposed to vapours of selected functionalised monomers and subsequently immersed into prepared solutions of antibacterial agents assessed as the most effective in the past works and simultaneously used frequently in commercial practice. Efficiency of the antibacterial surfaces created was characterised and examined employing available methods, for instance FTIR spectroscopy, scanning electron microscopy or terahertz spectroscopy, which belong among the newer experimental methods used in investigation of materials, and its advantages include particularly the possibility to study intermolecular forces. The antibacterial effect itself and its efficiency was verified with the aid of the agar diffusion test, which - while adhering to the test procedures - is considered to be equally effective as the dilution method and ranks among standardised methods. All the materials created were tested using a representative of gram-positive and gram-negative bacteria.

The theme of the dissertation work is contemporary and reflecting the current research trends in the given branch.

The work itself is conceived in a usual manner where - after a brief introduction - a literature search and subsequently aims of the work follow. These are succeeded by experimental results, discussion and finally conclusion. Subsequently, literature sources, a list of abbreviations, figures and tables are given in a well-arranged manner. The work has an adequate extent (136 pages) and contains 33 figures, 13 tables and 212 sources of the original literature.

The text of the dissertation is written with a comparatively high expertise drawing attention to current problems and limits in the given branch of science. For an unbiased reader the dissertation work makes an impression as being well-done and of a high quality and, in addition, it reads well (the text is "free-flowing, concise and well-oriented"). This clear and

comprehensible processing of the work demonstrates author's abilities and adequate knowledge of the branch studied.

As regards the formal aspect of the dissertation work I have no substantial comments or observations. Perhaps only quality of some illustrations contained in the dissertation could be better.

Within this opinion on the present dissertation I would take the liberty of asking a question to a discussion, namely what methods were used to prepare samples for the terahertz spectroscopy measurements.

In conclusion, I wish to say that the level of the present dissertation work exceeds the common average. Minute mistakes do not decrease the overall quality and level of the dissertation work. With respect to the quality of the work submitted, the author meets all the criteria required and has demonstrated to be a sufficiently mature individuality. It is particularly these reasons that lead me undoubtedly to the conclusion that

### **I RECOMMEND**

that Ing. et Ing. Kateřina Sulovská be granted the Ph.D. title following a successful defence of the dissertation work.

Zlín, 28th May 2016



Mgr. Roman Dlabaja, Ph.D.

ITC Zlín