

OPONENT REVIEW

Doctoral Thesis by TSERMAA GALYA:

Antibacterial Modification of Polymers by Using Metallic Compounds

The submitted doctoral thesis deals with a highly topical issue of polymer materials modification by metallic compounds with antibacterial action for medical applications. The selection of polyvinyl alcohol (PVA) as the studied polymer is very suitable both in light of its biocompatibility and biodegradability but also for its good mechanical properties. The combination of PVA with silver and zinc salts (nitrates and sulphates), proven antibacterial agents, is also very reasonable.

The work consists of the introduction summarizing theory regarding antibacterial polymers, modifying agents, and methodology of antibacterial activity testing, and four papers. The increasing knowledge about the selected subject and improving experience with samples preparation and the obtained data interpretation are evident from the papers.

The work is written in English of high quality style and grammar. The author and her coworkers have performed large scale of laboratory experiments to characterize PVA antibacterial systems. Because each of the paper was reviewed, only several questions and formal notes are added.

1. How was measured the thickness of PVA thin films modified with metal salts?
2. Why do you work with PVA 8-88 in case of silver salts and with PVA 6-98 in case of zinc salts?
3. Paper I, p. I-2: Static tensile measurements were performed on how many samples?
4. Paper II, p. II-4: Antibacterial tests were performed immediately after the PVA samples drying at different temperatures?
5. Paper II, p. II-16: Why is not the inhibition zone area presented in percent units? The results of antibacterial agents efficiency would be more obvious.
 - a. It should be written "polyvinyl alcohol or poly(vinyl alcohol)" instead of "poly (vinyl alcohol)".
 - b. Several non-uniform spacing occurs in the text, for example, on p. 17: 60-70% vs. 70 % alcohol.
 - c. p. 19: The number of equations and formulas should be written at the end of the line.
 - d. p. 20: The refer to Fig. 2 is missing in the text and the figure should be described more clearly; what does the orange "coils" represent?
 - e. Paper I: What is the meaning of the abbreviation "CL" on page I-3?
 - f. Paper III, tables I, II, IV: The concentration of $Zn(NO_3)_2$ should be quoted to one decimal place.
 - g. Paper III, table IV: The temperature characterizing T_g should be quoted to the nearest 1 °C.
 - h. Paper III, table II: The precision of moisture content is too high although the sample weighting was, as I hope, performed on an analytical scale.

The submitted work by Tsermaa Galya fulfils formal as well as scientific respects of doctoral thesis and is recommended for defending in front of the state committee. Tsermaa Galya should be doctored as "Ph.D." after the successful defense of her work.

In Brno, January 13, 2009


Ing. Radka Bálková, Ph.D.