

Review of the doctoral dissertation
„Preparation and characterization of superparamagnetic
inorganic/polymer particles for biomedical application“
by MSc. Beata Anna Zasońska

The submitted dissertation introduces a compilation work consisted of the introductory chapters (28 pages) and five separate scientific publications (B. A. Zasońska is listed as the first author and her contribution is estimated at 50-60 % in all cases). These chapters and publications deal with a consistent scientific problem. A certain exception is the part devoted to the “thionin-modified poly(carboxymethyl methacrylate) nanospheres”.

The main aim of this multidisciplinary dissertation was the preparation of the (magnetic) core – shell particles with controlled properties for their potential use in human medicine. Both chemical and biological experiments are described comprehensively with the possibility to reproduce them. I think that B. A. Zasońska achieved the main goals in her dissertation and she acquired valuable experimental results and applicable knowledge.

Nevertheless, I believe there are still several points in the dissertation, which B. A. Zasońska should give her attention to during the defence:

- (1) Reasons for the choice of the “shell” materials should be more specified.
- (2) In the course of preparation of the core - poly(N,N-dimethylacrylamide) shell particles you tested various initiators. Did you observe any differences in their initiation ability?
- (3) Do you have any (semi-quantitative) estimation of an extent of the tetraalkoxysilane transformation to silica under reaction conditions of your experiments?
- (4) For further use of the amino-functionalized silica it would be useful to know the concentration of amino groups. Do you have about this any idea?
- (5) For which potential applications may be advantageous to use a non-porous silica and for which, in contrast, a porous silica as the shell material?
- (6) You used the term “thionin” in the text of your dissertation and the term “thionine” in the publication No. 5. What is your comment on it?
- (7) What is the reason of the “zig-zag” curves use to fit the dependences in Figure 15 (page 34)?
- (8) How important is a nano-dimension for potential applications of your products?
- (9) In biological experiments it is often necessary to observe certain safety rules. Specify it, please, for your case.

I recommend to accept this doctoral dissertation of MSc. Beata Anna Zasońska for defence.

Prague, February 28, 2017

Petr Sysel, PhD
Professor
Department of Polymers. University of Chemistry and Technology, Prague