

Referee's Report on the Ph.D. Thesis

Self-Assembly in Mixtures of Surfactants and Stimuli-Responsive Polymers with Complex Architecture

by Anna Bogomolova, dipl. tech.

submitted to the Faculty of Science of the Charles University in Prague, Department of Physical and Macromolecular Chemistry

The core of the submitted thesis consists of four papers in international journals (*Macromol. Rapid Commun.*, *J. Appl. Crystallogr.*, *J. Phys. Chem. B.*, *Langmuir*) of which Ms. Anna Bogomolova is a co-author (in three of the four papers, she is the first co-author). The papers are devoted to the experimental study of aqueous solution self-assembly properties of copolymers responsive either to temperature (polyoxazoline derivatives) or to pH (poly-amino acid derivatives). Special attention is paid to the influence of nonionic surfactants on the self-assembly behavior of those copolymers. What can be seen as a certain drawback at this point is the fact that the Supporting Information files from the papers were not attached.

The introduction chapter of the thesis brings a detailed and well written review on the properties of temperature- and pH-responsive polymers, on the properties of surfactants and on polymer-surfactant interactions. It also provides basic introductory information on the principles of experimental techniques used for the above-mentioned studies, namely static and dynamic light scattering, X-ray and neutron small-angle scattering and isothermal titration microcalorimetry. The thesis is closed by a brief conclusion chapter that summarizes results of the four articles.

Having no general objections to the contents of thesis, I would like to ask the author to comment on the two points that concern rather the presented papers than the thesis itself:

1) In Article 2, SAXS data were fitted to the spherical shell model in which the excess scattering length densities (SLD) of the core and of the shell appear as parameters. The usual treatment of such models consists in using calculated values of SLD which then allow for the determination of the number concentration of the particles (and thus their molar mass) from the absolute scattering intensity. The authors, however, state SLD values as obtained from the fits, which require knowing their molar mass. Was this calculation done on the basis of molar mass determined from static light scattering?

2) With only one exception, electron microscopy was not used for the studies presented in the thesis, although the electron micrographs could support the results of scattering measurements. Were there any particular reasons for avoiding using electron microscopy?

My general opinion is that the work of Ms. Anna Bogomolova described in her thesis represents a significant contribution in the fields of polymer self-assembly in solution and polymer-surfactant interactions. In summary, I fully recommend to accept the submitted thesis for the defense.

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