Review of Doctoral Thesis

Title: **Synthesis and Characterization of New Polymers of Substituted Acetylenes**
Author: **Mgr. Radoslava Sivkova**
Study program**: Macromolecular Chemistry**
Supervisor: **prof. RNDr. Jiří Vohlídal, CSc.**
Department of Physical and Macromolecular Chemistry, Faculty of Science,
Charles University in Prague
Consultants: **RNDr. Jiří Zedník, Ph.D., doc. RNDr. Jan Sedláček, Dr.**
Reviewer: **doc. Ing. Vladimír Sedlařík, Ph.D.**
Centre of Polymer Systems, Tomas Bata University in Zlín

The reviewed doctoral thesis is focused on development of novel methods for synthesis of luminescent materials based on conjugated polymers with potential applicability in optoelectronics or for sensors fabrication.

The thesis consists of 89 pages divided into six main chapters.

The first chapter brings general introduction into the studied field (i.e. polyacetylenes, polyvinylenes and derivatives of 1,8-naphthalimide). The extension of the theoretical part by introductory text on Huisgen 1,3-dipolar cycloaddition that is used in the experimental work could improve the quality of the thesis.

Definition of the dissertation aims is shown in the second chapter.

The chapters three to five show experimental part of the work including results and discussion, summary remarks and introduction of the used materials and methods. The last chapter contains list of 148 references that can be considered as relevant.

The experimental work of the thesis is based on four manuscripts published in reputed journals, thus their scientific relevance and novelty can be expected. On the other hand, the thesis contains several formal imperfections (e.g. numbering of chapters – chapter 6 is missing, chapter 1.1 – first sentence (page 1), referring of text to figure (page 35, line 9), reference note (page 61, line 1)). What should be also avoided is the unclear description of elemental analysis methodology (name of the operator is not sufficient for the methodology description).

Please indicate the method of elemental analysis used in this work.

Further questions for the discussion part are the following:

1) How could the synthesized macromolecules investigated within this PhD work (both polymer systems and networks) be used in practise? Please provide your suggestion for their practical use including a way of their processing, identification of relevant analytes and detection limits (in the case of sensors).

2) Elemental analyses of samples (pages 73-79) –experimental data from elemental analysis provided the sum of detected elements above 99 % for samples designated as "M" and "A", which can be considered a good agreement with theoretical expectations. However, samples "B" show different results. The sum of their elemental (C, N, H, Cl) composition varies from 96.65 to 98.53 %. The sample designated as B2 has even 103.73 %. Please make a comment about it.

3) The stability of the polyacetylenes is mentioned in the work several times. However, experimental data on these parameters are not reported for the investigated materials. Please discuss their hydrolytic-, thermo- and thermo-oxidative stability.

4) Please explain a principle of energy transfer mechanisms between the polyacetylene main chains and pendant chromophores in the studied luminescent naphtalimide modified polyacetylenes.

5) Please summarize the contribution of your PhD study to science and/or practice and reveal your suggestions for further work related to your thesis.

The above mentioned comments and questions do not reduce the quality of the doctoral thesis. On the basis of that it is my pleasure to recommend Mgr. Radoslava Sivkova for the award of the PhD degree.

In Zlín, 16 August 2016.

doc. Ing. Vladimír Sedlařík, Ph.D.