



UNIVERZITA PALACKÉHO V OLOMOUCI
PŘÍRODOVĚDECKÁ FAKULTA

Katedra fyzikální chemie

Dissertation review

The following referee report was written on the basis of the assignment issued by doc. Ing. Petr Hlavacek, CSc, the dean of the Faculty of technology, Tomas Bata University in Zlin, Czech Republic. The doctoral dissertation, entitled "Sol-gel process and wax-coating for paper sizing applications" was submitted by Ms. Vera Lúcia R.G. Abreu. The thesis supervisor was Prof. Ing. Lubomir Lapcik, Ph.D.

The submitted dissertation deals with the impregnation of model paper sheet material by alcoholic solutions of polymerizing silicon alkoxides followed by drying steps, with the aim at improving the utility properties of such treated papers. Tetraethoxysilane, methyltrimethoxysilane and tetramethoxysilane are used as precursors for coating, the resulting coated paper sheets were subjected to numerous tests evaluating the changes in the physicochemical properties e.g. tensile strength, water repellence water uptake etc. A description of paper wax coating is included in the thesis as a separate task, in order to compare the properties of siloxane coated papers to the properties of more common wax coated paper, as stated in the Aims of this work section. Surprisingly, this is not mentioned in the Abstract part of the dissertation, different paper material and different experimental scale (laboratory vs. semipilot) was used for this purpose.

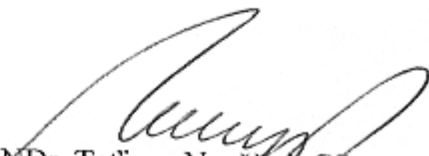
The dissertation comprises 108 pages altogether, divided into three main parts. The first part, entitled „State of Art“ reviews the materials science and technology of paper, followed by chapters describing sol-gel process applications and petroleum waxes. This theoretical part of the thesis is written concisely, showing the author's good working knowledge of her subject. The experimental part of the dissertation describes the preparation of the paper handsheets used for coatings, coating and postprocessing itself and surveys the methodology used for characterization of the coated paper. All data obtained are summarized in the Results section. Two papers authored by Ms. Abreu on the topic reported in the dissertation have already been published, they are included as appendices.

The author performed numerous original experiments and evaluated their results in a satisfactory manner. There is no doubt, that the research undertaken is of international quality. In addition, in the Conclusion section the author itself identifies possible weak points of her work and outlines directions of further research on the topic.

Questions: What is the cost effectivity of siloxane coated papers in comparison to current wax technology? Do you expect the development of siloxane technology using precursors studied by you into a larger scale?

In conclusion, the submitted dissertation fulfills all criteria required and therefore, in accordance to relevant legal regulations (Law No. 11/1998, §44) I recommend the submitted doctoral dissertation to be defended.

Olomouc, December 30, 2008


Doc. RNDr. Taťjana Nevěčná, CSc.