

Review of the Doctoral Thesis

“Testing of Pressure Sensitive Adhesives for Transdermal Therapeutic Systems”

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In the presented doctoral thesis the applicant prevailingly concentrates on extensive application-related characterization of transdermal therapeutic systems (TTS) and pressure sensitive adhesives (PSA).

The emphasis was laid especially in three ways:

- 1) determination of adhesive properties;
- 2) determination of rheological properties;
- 3) determination of diffusion properties.

The introductory part documents very good orientation of the applicant in the topic not only what concerns the presented literature review but also very good interlacing of the conclusions derived in the cited papers.

The problem is that in this case the traditional used rheological approach SAOS (Small Amplitude Oscillatory Shear) measurements fails due to its inadequacy as strain values of skin differs in the order(s) – and is at least 40x higher. The diversion from the classical procedure presented in the thesis can be documented among other things by a usage of the modified Carreau-Yasuda model and especially by an application of LAOS (Large Amplitude Oscillatory Shear) measurements. Simultaneously a new procedure called RheoTack was developed providing better characterization of adhesion and detaching properties.

The thesis is written very carefully and well-structured, practically with no misprints. The individual subtopics are well documented (also graphically) and explained.

As an evidence of good quality of the submitted thesis it is necessary to mention publishing of the partial results in the renowned international journals on rheology in the recent period (and forming a part of the Doctoral Thesis).

For better elucidation of the obtained results the following comments should be discussed:

- How were used the advantages provided by a twin drive rheometer in comparison with the classical one?
- How many harmonics are sufficient for a description (characterization) of the experiments?
- Was it possible to neglect the presence of noise in the LAOS measurements?
- Does the used Carreau-Yasuda-like fitting provide better flexibility in time-stress characteristics in a comparison with the classical Carreau-Yasuda model?

In no way these comments lower a very good quality of the thesis presented. The thesis fulfils all the demands imposed on this work.

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Petr Filip

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