REPORT OF SHORT TERM SCIENTIFIC MISSION - COST ACTION FP 1006

Stabilization of IPBC in wood preservatives through the organosilicon compounds - chemical analysis

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by

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1. Purpose of the STSM;

The primary goal of this STSM was to broaden my knowledge in the field of research procedures associated with chemical analysis of wood treated with organosilicon compounds. Prof. Holger Militz and Dr. Carsten Mai from Georg-Augus-University have worked long time on the topic of wood modification with silicon compounds. I should admit that this was one of the main reasons why I chose this institution for my visit.
The specific aim of my scientific mission was to perform a chemical analysis of a model preservative systems containing IPBC and organosilicon compounds. The analysis concerned both liquid impregnation solutions and treated wood. The FTIR analysis carried out will allow me to explain chemical processes between organosilicon compounds, wood, IPBC and Fe pigments. The knowledge of chemical reactions is necessary for comprehensive characteristic of my data. The analysis of the results assists to specify the further direction of research within the overall project scope.

2. Description of the work carried out during the STSM;

During STSM I accomplished General Work Plan which I sent to Action Chair and STSM coordinator before my mission. I researched and realized chemical analysis of model preservative system (MPS) and treated wood.
MPS includes fungicides (IPBC), organosilicone compounds (methylotimethoxysilane MTMOS, aminethyl-aminpropyl trimethoxysilane AEAPTMOS, n-octylotrimethoxysilane NOTES and fluorosilanes) and pigments (Fe-pigment).
Samples of pine wood (*Pinus sylvestris* L.) were treated with the MPS in my home institution (Institute of Wood Chemical Technology) at Poznan University of Life Sciences.

Daybook

date	Activity	description
5.03.2012	Arrival to Goetingen	Gestehouse accommodation, Official visit in Georg-August-University
6.03.2012	Meeting with my attendants Visit to a workplace	discussion about the planned experiments visit laboratories, office and technical facilities
7.03.2012	ATR-FTIR analysis	Learning how to make an experiment
8.03.2012	ATR-FTIR analysis	measurement: wood
9.03.2012	ATR-FTIR analysis	Measurement: wood treated with organosilicone compounds
12.03.2012	ATR-FTIR analysis	Measurement: wood treated with organosilicone compounds
13.03.2012	Attendance in PhD thesis defense	
13.03.2012- 15.03.2012	ATR-FTIR analysis	Measurement: wood treated with organosilicone compounds and IPBC
16.03.2012	FTIR analysis Preparation of MPF	Learning how to make an experiment MPF with MTMOS
19.03.2012	FTIR analysis	Measurement: organosilicone compounds (liquid)
20.03.2012	FTIR analysis Preparation of MPF	Measurement: MPF with organosilicone compounds (liquid)
21.03.2012	FTIR analysis Preparation of MPF	Measurement: MPF with IPBC and organosilicone compounds (liquid)
22.03.2012	FTIR analysis Preparation of MPF	Measurement: MPF with IPBC, Fe-pigment and organosilicone compounds (liquid)
23.03.2012	ATR-FTIR analysis	Measurement: wood treated with organosilicone compounds, IPBC and Fe-pigment
26.03.2012	ATR-FTIR analysis Leaching wood treated	Measurement: wood treated with organosilicone compounds, IPBC and Fe-pigment
27.03.2012- 29.03.2012	ATR-FTIR analysis Leaching of the treated samples	Measurement: wood treated with organosilicone compounds, IPBC and Fe-pigment Measurement: water extracts from leaching trials
30.03.2012	current affairs	

2.03.2012	ATR-FTIR analysis	Measurement: wood treated with organosilicone compounds, IPBC and Fe-pigment Measurement: Leaching wood treated
3.03.2012	ATR-FTIR analysis	Measurement: Leaching wood treated
4.3.2012	Mitting with attendant	Results analysis and discussion
5.03.2012	Official farewell	Results analysis and discussion
6.03.2012	Homecoming	

3. Description of the main results obtained;

During my stay in Gottingen I learned the technique of FTIR and ATR-FTIR method for wood and treatment solution analysis. The great number of my measurements (ca. 1000) up till now can only indicate of the general trend results in my data.
The performed tests and obtained results proves reaction between organosilicone compounds and wood. It is documented the major presence of characteristic Si-C and Si-O bonds in the scope of 700-850 cm-1 (vibrations Si-CH3), and vibrations ranging between 2840cm-1 and 1190-1080 cm-1 which correspond to Si-OCH3 bonds.
For example, FTIR spectrums of pine wood *Pinus sylvestris* L. which were treated at 5% AEAPTMOS, are compared with untreated pine wood (Fig. 1).

The spectrums are currently analyzed with the use of statistic programs, for preparation of the detailed results analysis.

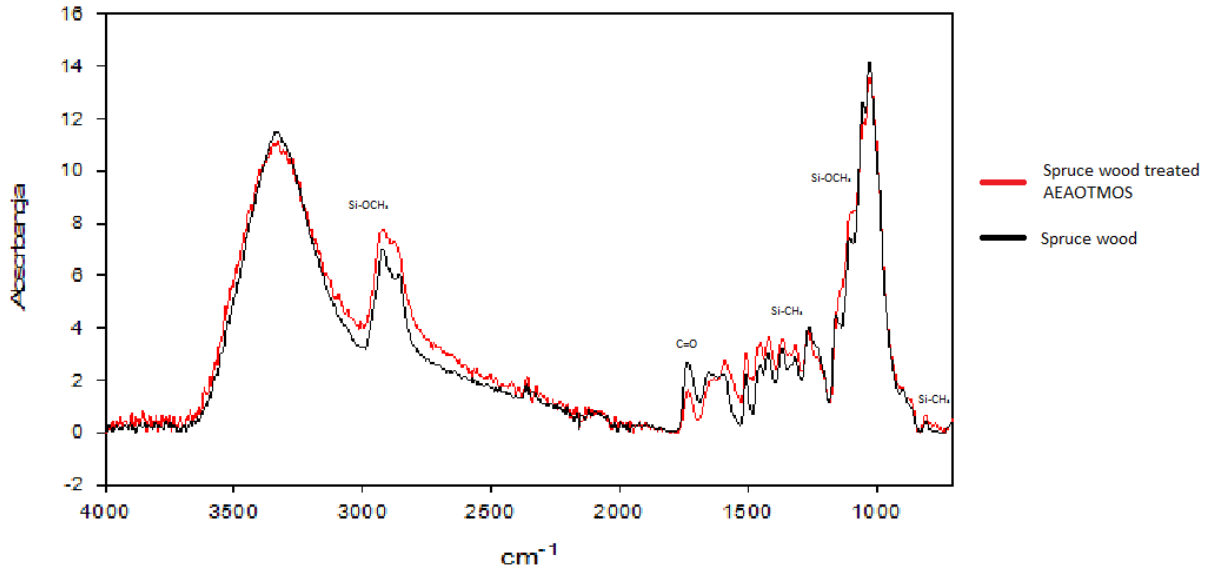

Fig. FTIR spectrums of pine wood *Pinus sylvestris* L. which were treated at 5% AEAPTMOS, are compared with untreated pine wood

4. Future collaboration with host institution (if applicable);

I believe that my further cooperation and cooperation of my home institution with host institution is the most realistic. An example of further cooperation can be next STSMs, PhD study or students exchange within the Erasmus program

5. Foreseen publications/articles resulting or to result from the STSM (if applicable);

We are planning to prepare a joint publication on the basis of the gathered results. I am just under preparation of the detailed results analysis for this paper.

6. Confirmation by the host institution of the successful execution of the STSM;

Appendix - Bescheinigung Perdoch

7. Other comments (if any).

I would like to thank Professor Holger Militz and Doctor Carsten Mai for the care and support during my STSM. Research and accommodation conditions at Georg-August-University in Gottingen were excellent. The research team at laboratories was highly helpful, so I felt comfortable in its new location. STSM was a fantastic experience for me and a unique opportunity to perform the necessary analysis for my project.
I should like also to record my appreciation to the MC of COST FP1006 and to the COST Administrative Secretariat for granting the funding to allow me to carry out this Scientific Mission.