

**Project name:** **X-ray tomographic investigation of impregnated wood**

**Beamtime Report**  
**01.04.2014 - 25.04.2014**

**General information**

<b>Name of the rapporteur</b>	<b>Name of the rapporteur's organisation</b>
Nikolay Kardjilov	Helmholtz-Zentrum-Berlin (HZB)
<b>Type of research (nanotechnology/health care/chemistry etc.)</b>	<b>Name of the research facility</b>
Environment, Chemistry	Ekopine
<b>Date of the measurement, duration</b>	<b>Location of the event</b>
15 April 2014, 5 samples x 1 hour = 5 h	MicroCT scanner at HZB
<b>Facility personnel participating in the measurement</b>	
<i>Nikolay Kardjilov, Ingo Manke, André Hilger</i>	

**Description of the project**

<b>Research description (short summary as written in the application)</b>
The tomographic investigation of the impregnated wood samples by X-rays provides the spatial distribution of the impregnation solution in 3D. In these first test measurements it was important to see if the contrast is sufficient to observe the impregnation. Segmentation and quantification of the volume fractions in the samples were the aim of the study.
<b>Summary of activities (experiments performed, beamtime used, preliminary overview of results, next steps and other relevant information)</b>
Samples with different impregnation treatment were prepared by the partners from the company Ekopine. A single referent sample without any treatment was provided as well. The tomography investigation by X-rays with a spatial resolution of 22 $\mu\text{m}$ was sufficient to provide contrast for the distribution of the impregnation solution in 3D. The contrast helped to separate the different phases in the sample. The volume fraction of the impregnation was visualized and analysed for the 5 samples. The data were provided in form of digital images and videos. Summary presentation of the data was prepared and provided to the partners from company Ekopine.  X-ray photoelectron spectroscopy (XPS) measurements of samples were performed at the University of Turku to obtain supplementary chemical information in addition to the tomography experiments.
<b>How would you describe cooperation and assistance from industrial liaison officers and national contact points while preparing and carrying out the research at large scale facilities?</b>

Everything went smoothly. The assistance of the industrial liaison officer was essential part of the investigation.

#### **Other personal remarks**

EKOPINE's experience and benefits from the synchrotron services: How will EKOPINE utilise the results and to what business actions will they lead:

- Results of these measurements will be utilized in the development of oil chemistry. We learned that physical methods can be helpful in our chemical development work.
- Now we are in the middle of the biggest changes during the existence of our company. Our goal is to tenfold the capacity of the company and to start a new development project.

EKOPINE's evaluation of the SCIENCE LINK EXPERIENCE

- This experience showed out well how SMEs can utilize cooperation with research institutes.
- Project made us to realize the possibility of utilizing physical research methods for our samples.
- Project inspired us to continue utilizing new methods in our product development work.

## **Annexes**

### **Annexes**

(list of annexes; meeting minutes, graphical illustrations, tables and other supplementary data)

Summary presentation of the results in Power Point format.