

Summerschool 2018: Functional Coatings

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In September 2018 (24.-27.) some of my fellow students and I had the chance to go to the Summerschool 2018 in Hasselt (Belgium). The topic of this event was 'Functional Coatings'. We have learned a lot about special printing and coating mechanisms, ink compositions and its application in industry but also in our daily life.

The start of the Summerschool was on Monday the 24th September. But we decided to start on Sunday and do a trip to Liège in the afternoon. On the way to Liège we already had so much luck. After one hour of driving in the car, we got in a traffic jam. Actually, it was only a small accident, but by forming a corridor for emergency vehicles access, a few cars crashed into each other. A small accident turned into a lot of trouble for police and all drivers there. These crashes caused a delay of one hour. After this we finally arrived in Liège. But we continued to be lucky. It was raining and raining and raining and the weather was freezing cold. However, we went to the tourist information, walked through the city and did some sightseeing. We passed a few churches, the 'cathedral de Liège', a small port with many yachts and the 'opera royale de Wallonie'. From afar we saw ' l'Eglise du sacré-coeur' and the parliament. Actually, we had the plan to look for a restaurant and try some Belgian food, but almost every restaurant there was closed. There were only a few cafes that were opened. That was why we ended in a little café and drank hot coffees and teas to get our bodies warm. In general, I would say, Liège has some interesting places to visit, but the city seemed not that pretty to me. Maybe my bad impression was because of the bad weather and its resulting grey and dark look of the city. Furthermore, Liège consists of areas with old crumbled buildings, that also decreases the atmosphere of the city.

In the evening we continued our trip to Hasselt, more precisely we drove to the 'Hostel H', where we were going to stay for the next days. The Hostel had a very new and modern look. The rooms were very clean and the Hostel was very handicapped accessible. In the lobby other students from Zweibrücken waited for us and we went together to the citycenter to grab some food. In Hasselt too, only a few restaurants were open.

Monday 24th of September – the first day of the Summerschool started. As soon as we arrived the Hasselt University, we had a lot of trouble finding the right building and room. So, we did our own 'guided'campus tour without a guide. After a short delay, we found the right room and joined the first lecture. On the first day, we had the chance to listen to masterclasses with different topics. I decided to listen to

Masterclass 2 and 3. The second Masterclass was about Surface preparation, characterization and thin film deposition technology. This lecture was very interesting, because we dealt a little bit with this topic in the subject 'Micro system technology' in the first semester of our studies. The third Masterclass, discussing ink formulation, gave us some useful information that we can use for bioprinting technologies. In the afternoon we listened to a speech of the DAAD-project and its organisation. After these lessons we all met in the lobby to get in contact with each other and share information. Unfortunately, most people did not spend much time there.

Tuesday 25th of September. On the second day of the Summerschool we had several lectures about coating formulation and deposition held by professors, PHD-Students and people from industry. So we had the chance to see that topic from different sites. On the one hand the view of the industry and on the other hand the view of the engineering researchers. After getting a huge amount of information, the next point of the program started. We went on a guided tour through the technology centre. Our last stop was in the packaging proof centre. It was very interesting to learn how food packages get tested. At the end of the tour a conference dinner with very tasty food followed. They organized a food truck. For the main dish we tasted original Belgian meatballs with mashed potatoes and tomato sauce.

Wednesday 26th of September. This day was equal to the day before. But in some lectures more chemical topics of printing were included and we understood a bit more. It fitted better to our studies and we were able to ask some questions. In the evening fellow students and me went to the city of Hasselt to try other Belgian delicacies. We ordered some food in a Belgian 'Frittur'. Everything was fried there. Certainly, everyone tested some Belgian fries. But individually I prefer some thin fries. The food shop offered to fries some peanut sauce. This combination had a good taste. To my fries I tried some 'Bitterballen'. The Outside looked like a round croquettes. But inside there was a mush of different meat (beef and pork). It tasted like its look- not good. Other fellow students tasted 'Frikandel'; it is a fried sausage made of minced meat and 'vlesch Kroket' it equals 'Bitterballen' according to the ingredients but is has the shape of a long croquette. Referring to food and drinks I was surprised that Belgian beer has so much alcohol in it. At this week in Hasselt there was a funfair. We strolled through it and went on a rollercoaster turn. At the highest point of the rollercoaster you had a nice view over Hasselt and you could see the sunset.

Thursday 27th of September. On the last day of the Summerschool the programme said: Hands-on labwork. There are four different laboratories which were spread in Hasselt, Leuven and Brussels. By doing our registration for the Summerschool some weeks ago, we had to sign in for these lessons. We had to choose between 'ink formulation', 'Coating technology-bar and spray coating', 'Optical coatings', 'Characterization of coatings, defects and corrosion protection in action'. I applied for ink formulation and Coating technology. In the morning we started with Coating technology. We went to a laboratory with several printing models. We got told and shown how an inkjet, a spray and a bar printer works. Unfortunately, one of the printers did not work and the lab-workers could not fix it. Before the layer gets coated, it has to be prepared by plasma or corona treatment. By getting this treatment the surface energy of the layer changes and it gets inherent for the coating material. In addition some small experiments with coating were presented. There was for example a printed piano. The keyboards were printed on a thin plastic layer and by touching the printed fields you activate a sound of a piano. In another experiment you were able to change the colour of a diode by touching different printed fields on a plastic layer. Very fascinating to me was an elastic band with diodes and coated electric branching. Despite of stretching the band the diode also works. After the lunch break we changed the laboratory to a chemical laboratory. First, we got an introduction about the ingredients of metal ink and how the experiment runs. Because we did not have that much time, we had to stop the experiment without finishing it. But we managed to isolate and filtrate blue copper. Afterwards the summerschool was over and we drove home to Zweibrücken by car. Luckily there was not much traffic and no accident.

In general, I would say, the Summerschool was a very interesting and interactive event. And I am very glad to have had the chance to go to Hasselt and join the Summerschool 2018. Although the science information were quite detailed and we did not understand that much, because our studies 'applied life sciences' did not examine these topics much, you got to know so much new information about functional coatings. Furthermore we either could improve our knowledge or get in contact with so many scientific motivated people. According to the organisation almost every programme was on and in time. But in my opinion, the days were very full of listening to information. Maybe the next time they will mix the practical and theoretical lessons together to get a better variety and every person is receivable for the presented facts in lectures all the time. Another possibility is to keep one afternoon free from lectures to explore Hasselt and get to know insider facts of this city. Concerning 'Hasselt', it is a nice and very clean city with beautiful places and nice bars. Especially all over the city there were tables, chairs or some art made of

bicycles. It is a good idea to make the city look great. In my opinion it was surprising that a lot of shops already close at 6 o'clock and many restaurants did not open on Sunday evening. Additionally, the organizer of the Summerschool valued nice hospitality and very delicious food every day.