

A grade eleven's week at the Institute of materials science

Since I have always been interested in chemistry and physics, I wanted to find out whether I should consider a career in materials sciences. While searching the internet I realised that I would like to do an internship at the institute for materials science in Stuttgart, because this was the best and nearest place to do that. In the following I will report on my week at the institute from a student perspective.

On my first day at the institute for materials science I was able to talk with Dr. Petia Atanasova, a chemist, who studied organic chemistry before finding her passion in biotemplated structured semiconductor materials. She takes biotemplates, like DNA or TMV, a virus, from nature, structures them and puts layers of semiconductors on them. The aim is to find semiconductors, which can be produced at moderate temperatures and are relevant to technology. The main goal is to produce hybrid materials, materials with a biologic and an inorganic part, for technologic components. Petia also mentioned that, later on, they want to use this type of technology for sensors. I found it particularly interesting that on the one hand the material she works with is so minuscule and and she still can manipulate them.



A measurement tool Petia uses

On Tuesday morning Chen Peng, a master student, introduced me to ABO_3 materials and explained that he wants to swap the oxygen with nitrogen to create semi-conductive materials. I had the chance to follow his first attempts to use nitric acid for neutralisation of the components. In the afternoon I had the chance to attend a presentation of the PhD students Timotheus Jahnke and Stefan Kilper on a possible future project.

On Wednesday morning Vera Bader and Sarah Ulmer, a bachelor and a master student, showed me their research on creating algae that are magnetic and coccoliths that are photoluminescent. They do that by inserting rare earths into their respective algae cultures. I was intrigued by the possibilities of this method for use in nano robotics. Later Joachim Häcker, a master student, explained to me another version of the oxygen- nitrogen swapping procedure and showed me an X-Ray Diffraction device in action. With an XRD you can look into the structure and components of the material on an atomic scale without manipulating or damaging the compound.

On Thursday I first met Dr. Wenjie Xie, head of the thermoelectric division. He introduced to the topic of transport properties of thermoelectric materials and showed me the different steps, i.e. material preparation, characterisation, measurement of physical properties. I found it very interesting that, according to Dr. Wenjie Xie, usage of thermoelectric materials is also relevant to companies such as BMW or Bosch. In the afternoon I first met Dr. Xie's students and after that went back to Joachim Häcker to analyse the findings from the experiment conducted the previous day. He found out that he had to adjust the temperature for following experiments.



On my last day I met Xingxing Xiao, a PhD student, working on another project in a similar field as the master students Chen Peng and Joachim Häcker. She showed me her work on ABO_4 structured materials.

The whole week was a great experience and I am very grateful that so many enthusiastic and terrific scientists took so much time to accompany me and give me glimpse at the world of materials science. I would love to repeat the experience and I am looking forward to starting to do studies in that field myself. I would like to thank everyone I met this week and especially I want to thank Prof. Dr. Anke Weidenkaff and Juliane Kränzl, who made my internship possible.