

Science in School

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The education in natural sciences is a crucial point in the enablement of our young generation to help to solve the problems of our world. An important part of the curricula of Austrian schools are lessons in natural sciences. The schools have different possibilities to design the curricula and additional projects.

Part I: At the HTL Leoben the students study curricula, which are unique in Austria. For example, in the new curriculum “Materials and environmental techniques” the students at the age of 15 to 19 years have lectures in “Science” and “Science Lab”. In these lectures up to maximum 12 students work together to solve special problems in the lab and in theory. Here we collaborate with universities, scientific institutions and companies. A strong relationship exists to the SPM Group of the Institute of Physics at the University of Leoben. Lectures of “Science Lab” are being partly taught in the Lab of the SPM-Group of this institute. Students of the HTL Leoben do their internships trainee practice at the University of Leoben, for example within the project “Nanocellulose as stabilizer for burned paper” or “Nanofatigue”. Other scientific partners include the Forschungszentrum Jülich and the Materials Center Leoben. In the talk future projects with partners from Leoben and abroad are shown. Students of the HTL Leoben won several prizes at the international earth science Olympiad and the Physics Olympiad. The HTL Leoben was awarded the MINT seal of quality and the Young Science Award.

Part II: Not only schools in Leoben have partnerships with the university of Leoben. With Stefan Lorbek, a former member of the SPM group led by professor Christian Teichert at the university of Leoben, students of the grammar school in Mürzzuschlag, Austria, get the possibility to participate within the scientific work of the SPM group. The students get an insight of scientific work in nanoscience which can never be covered by the usual teaching from a non-technical school. Last school year, one of our students made his pre-scientific thesis, which is part of the school leaving examination in Austria, at the SPM group. His work was titled “Epitaxial growth of organic semiconductors on ultra-thin layered materials” and was awarded first prize by an annual jury of Breitenfeld Edelstahl AG, an important steel producing company in the region, for its high scientific quality. He investigated dihydrotetraazaheptacene epitaxially grown on top of ultra thin layers of hexagonal boron nitride on a silicon dioxide wafer with AFM. Another student was chosen for an internship this summer in Teichert’s group investigating barium titanate with different additives like niobium, trying piezoresponse microscopy under supervision, and performing tapping mode and phase imaging with AFM of PS spherules embedded in/upon paraffin used as a model system. Next to these students, three others were working this summer in a science group of the Materials Center Leoben (MCL) led by Roland Brunner a former member of the institute of physics at university of Leoben. They were analysing different data from electron microscopic and energy dispersive X-ray spectroscopic investigations of four different anode materials of silicon-based Li-ion cells and polycrystalline fast ion conductor materials (tantalum, lithium, lanthanum, zirconium and oxygen). Besides this, we offer our students the training and participation at international competitions, like the International Physics olympiad. Even this years’ olympiad in Lithuania had to be held online, one student of Styria was awarded with gold medal. Often the tasks at this competition are at university level and sometimes concern even topics from nanoscience.