

***Bachelor thesis on materials for hydrogen production by Benjamin Switon has been honoured as best thesis in Chemistry***



*At the annual awards ceremony Benjamin Switon, second from left, is honoured by representatives of the sponsors of the award (Vestische Freundschaft, and Scholz colourpigments) and of WH.*

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Benjamin Switon was awarded the prize for the best Bachelor thesis in Chemistry at the annual awards ceremony held at Westfälische Hochschule. His thesis, titled 'Molybdenum Sulfides on Carbon-Containing Substrates,' is the result of a semester abroad in the GREMI laboratory at Université d'Orléans, France. The award fits perfectly into the 10th anniversary celebration of the student exchange program for internships between the two universities.

Hydrogen gas is believed to be an important energy carrier in circular economy. It is produced from water and can be converted back to water with the release of a considerable amount of energy, for instance, in polymer electrolyte membrane (PEM) fuel cells. Highly efficient PEM cells can also perform hydrogen production by water electrolysis. However, from the chemical point of view the reaction is hampered by overvoltages and effective catalysts are needed. So far, for the hydrogen evolution reaction (HER) at the cathode platinum is the prevalent and best catalyst, however, its high price and low availability hampers further expansion of the technology to a broader market. Molybdenum sulfide, MoS<sub>2</sub>, may replace platinum as a catalyst material, but its activation by small modifications of the crystal structure is necessary.

In the present work, layered electrodes of nanometer sized MoS<sub>2</sub> crystals deposited on upright carbon nanowalls were fabricated by means of low temperature plasma deposition. Plasma processes are very flexible tools and allow to combine several production steps. This project will be continued in the frame of a research collaboration between the University of Orléans (Prof. Eva Kovacevic, Dr. Johannes Berndt) and Westfälische Hochschule (Prof. Franziska Traeger).