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UNVEILING ENANTIOSELECTIVE SURFACE PROCESSES AT THE CHIRAL SOLID-LIQUID INTERFACE OF WORKING CATALYSTS

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Project Summary: Enantioselective heterogeneous hydrogenation would be an attractive route for the production of enantiopure products. The lack of information on enantioselective surface processes on noble metal catalysts and about hydrogenation catalysis at catalytic solid-liquid interfaces in general represent a major stumbling block for a rational design of such catalytic systems. One of the aims of Laura's doctoral work is to close this gap of knowledge by developing spectroscopic techniques suitable to characterize surface processes on supported noble metal catalysts under working conditions (operando). In this presentation, it will be shown that the combination of ATR-IR and UV-Vis spectroscopies is a powerful tool providing quantitative molecular-level information on heterogeneous (asymmetric) hydrogenation. To demonstrate the level of insight attainable from the operando spectroscopic characterization the influence of reaction parameters such as the concentration in liquid-phase are traced back to the molecular level in the asymmetric hydrogenation of methoxy-pyrones on chirally-modified Pd catalyst. It will be shown that the enantioselecting ability of the chiral modifier cinchonine quadruples depending on its orientation on the Pd catalyst.

CV: Laura holds a B.Sc. (2012) and M.Sc. (2013) in Chemical- and Bioengineering from ETH Zurich. In 2014, she started her PhD studies.

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