

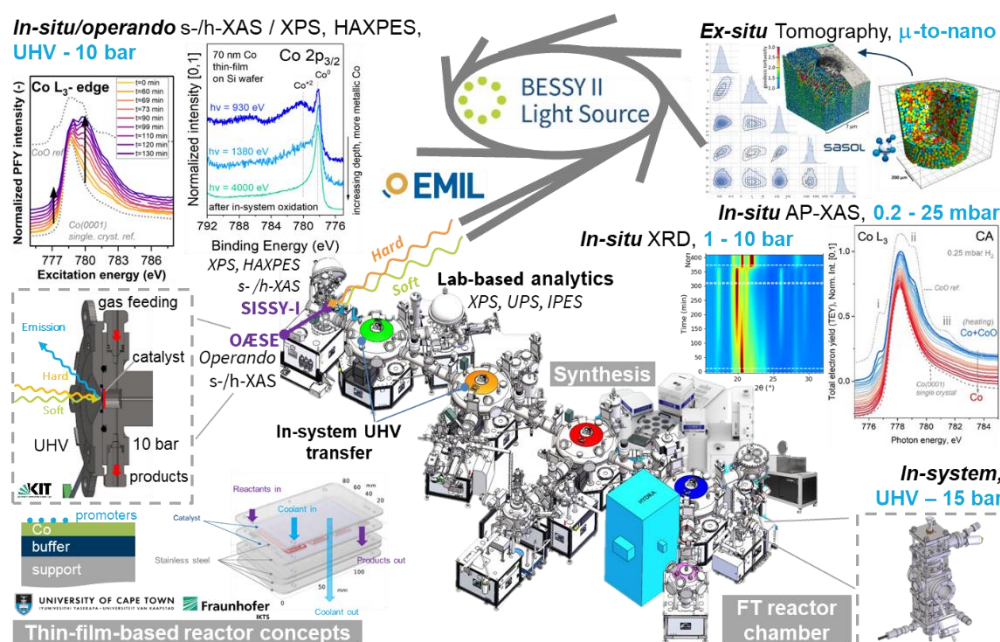
Multi-Scale Investigations of Fischer-Tropsch Catalysts at the BESSY II Synchrotron Light Source for the CARE-O-SENE project

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The CARE-O-SENE project aims at advancing the development of Co-based catalysts for sustainable aviation fuel production via Fischer-Tropsch-Synthesis (FTS) [1,2]. This contribution showcases the capabilities of the BESSY II synchrotron light source enabling the exploitation of multi-scale imaging and spectroscopy techniques for *in-system*, *ex-* or *in-situ*, and *operando* characterization of thin-film or powder FT catalysts. We present results from model and commercial catalysts characterized by X-ray diffraction (XRD), ambient pressure soft and hard X-ray photoelectron and absorption spectroscopies (AP-XPS, HAXPES and XAS) as well as correlative synchrotron- and focused ion beam (FIB) tomography, enhanced by machine learning approaches, enabling detailed 3D data analysis of catalysts across micron-to-nano scales. These efforts provide crucial insights into the structural, chemical and electronic properties that govern catalyst activity and selectivity.

Fig.1 – Cobalt-based catalysts studied at the BESSY II Light Source.



References: [1] <https://care-o-sene.com> (retrieved 11/01/2025); [2] Moodley, D., et al. Catalysis for a Sustainable Environment, (2024), 73–116.