

SOLARIS NEWS



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EXPERIMENTAL
HALL**

**SOLARIS
INDUSTRY DAYS**

**STUDYING
LOW-Z
ELEMENTS**

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A quick overview of the new event series, aimed at applied and industrial research



EXPERIMENTAL HALL EXPANSION

Long-awaited expansion of our experimental hall has finally begun in August 2022. Planned construction work will allow us to expand the area of our experimental hall by almost 30% and to accommodate four new beamlines. Additionally, new office and laboratory spaces will be created.

Two of the beamlines, which will be located in the new part of the building, will be hard X-ray beamlines: SOLCRYXS, which will be primarily a macromolecular crystallography (MX) and SAXS, which will focus on small-angle X-ray scattering (SAXS) and wide-angle X-ray scattering (WAXS) techniques. Two additional beamlines are in the conceptual/planning phase.

Construction work is expected to finish in February 2023, which will allow for the return to normal operation of the synchrotron in March.



Construction work at SOLARIS (photo: Krzysztof Adamczyk)

ASTRA BEAMLINE OPENING

After numerous safety and performance tests and optimization of key parameters, on June 29th, ASTRA beamline (formerly known as SOLABS beamline), has been officially opened. The beamline is the joint project of SOLARIS with Hochschule Niederrhein (Germany), Synchrotron Light Research Institute (Thailand) and University of Bonn (Germany). ASTRA beamline was specifically designed for XAS (X-ray absorption spectroscopy) measurements in the tender energy range, however hard X-ray measurements are also possible.

The opening ceremony of the beamline was attended by many distinguished guests: German Consul General Dr. Michael Groß, Rector of Hochschule Niederrhein, Dr. Thomas Grünewald, Director of the SOLARIS National Synchrotron Radiation Center, Prof. Marek Stankiewicz, Vice-President of Hochschule Niederrhein, prof. Alexander Prange, the representative of Jagiellonian University, Prof. Stanislaw Kistryn and the representative of the University of Bonn, prof. Josef Hormes.

Research conducted on the beamline will contribute to developments in fields such as materials science, physics, chemistry, biomedicine, and environmental studies. The beamline opens up opportunities for cooperation with the rubber, agricultural, chemical, and cosmetic industries.



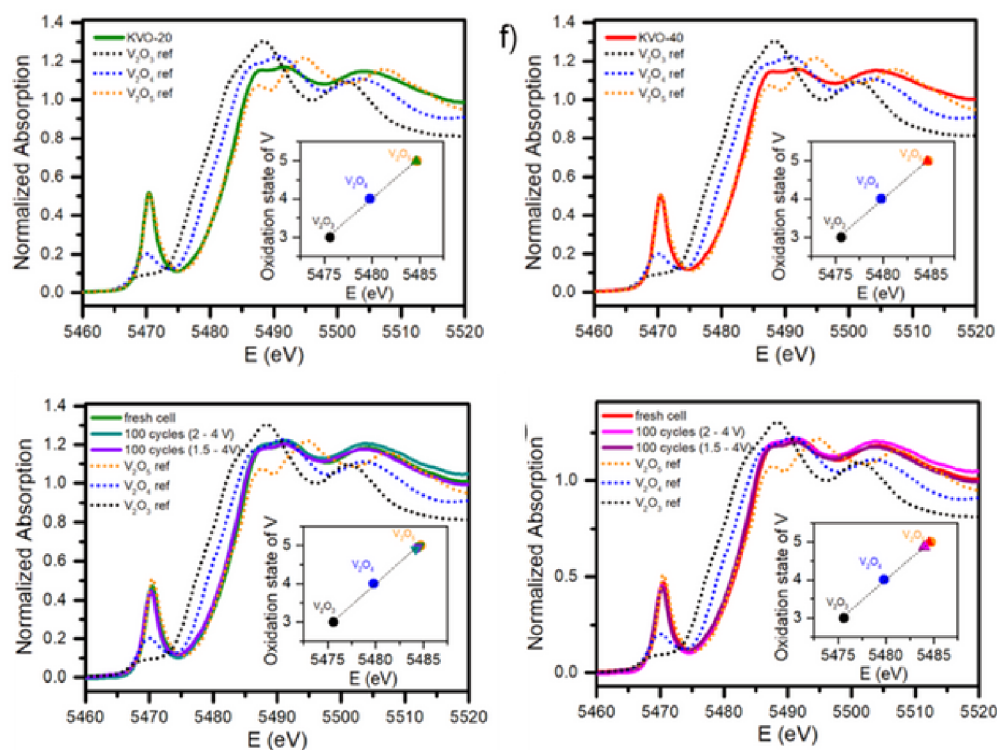
Opening ceremony of the ASTRA beamline (photo: Agnieszka Cudek)

MEASUREMENTS OF LOW-Z ELEMENTS

ASTRA beamline at SOLARIS allows the measurements in the photon energy range of 1keV to 15keV. While there are several beamlines worldwide, allowing users to carry out measurements using soft X-rays ($E < 1\text{keV}$) and hard X-rays ($E > 5\text{keV}$), photons in the so called "tender energy range" ($1\text{keV} < E < 5\text{keV}$) are rarely available, making ASTRA uniquely suited for the measurements of the K-absorption edges of medium to low-Z elements, from $Z=26$ (Fe) to $Z=11$ (Na).

X-ray Absorption Near Edge Structure (XANES) and Extended X-ray Absorption Fine Structure (EXAFS) measurements of these elements are especially relevant for biological processes (for example iron, sulfur, or phosphorus), but also for important industrial applications. The examples include silicon, used for the production of paints and adhesives and in the pharmaceutical industry, sulfur, used in rubber vulcanisation processes, or vanadium, used in catalysis and electrochemistry, as a cathode material.

First results obtained on the ASTRA beamline have already been published and first pilot industrial experiments were performed. In-situ and operando options are expected to become available in 2023.



Przeźniak-Welenc, M., Nadolska, M., Jurak, K. et al., *The valence state of vanadium-key factor in the flexibility of potassium vanadates structure as cathode materials in Li-ion batteries.* Sci Rep 12, 18751 (2022). <https://doi.org/10.1038/s41598-022-23509-x>

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SOLARIS INDUSTRY DAYS

In 2022, we launched a series of one-day workshops: Solaris Industry Days, focused on the cooperation with industrial partners. Each event is devoted to a single industry sector.

So far, three workshops were organized, focused on the following application area or industrial sectors:

- Cryogenic electron microscopy (cryoEM) for life sciences - organized together with Małopolska Centre of Biotechnology
- Nanotechnology sector - organized together with the Silesian NANO Cluster
- Ferrous and non-ferrous metals sector - organized together with Deloitte Poland

During each event, participants can learn about synchrotron radiation and cryoEM, get to know the characterization techniques available at SOLARIS and how they can be used to solve the specific problems, faced by the given industry sectors and find out which cooperation options are available.

Presentations and workshops are led by industry-oriented scientists from SOLARIS and our partner institutions, which are experts in certain set of experimental techniques. The tour of the facility and its beamlines and experimental stations is a great opportunity for networking and planning future cooperation.

We are planning to continue the workshop series in 2023, targeting new industry sectors. Stay tuned for more information!

SOLARIS Industry Day



CONTACT OUR INDUSTRY LIAISON OFFICE FOR MORE DETAILS ABOUT OUR OFFER

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STAY TUNED FOR THE NEXT NUMBER
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