BM01
Functional materials and devices studied in their working environment

APPLICATIONS

In-situ electrochemistry
Battery research

Metal Organic Frameworks
In-situ measurements of guest uptake and release processes

Photovoltaic materials
Crystal, powders, thin films – phase stability, cycling, strain engineering

Ferro electrics
In-situ synthesis, thin films and crystals, in-situ electric field domain manipulation

Structure – property correlations for a broad range of materials

INSTRUMENTATION AND EXPERT SUPPORT

Single crystal diffraction
Chemical crystallography, Diffuse scattering, High-resolution mapping of reciprocal space

Powder diffraction
Structural analysis, high resolution and high intensity measurements, fast in-situ data collections

Diffraction from surface
Mapping of reciprocal space and texture, in-depth scanning

COMING IN 2022
Small angle diffraction *in combination with all above techniques*

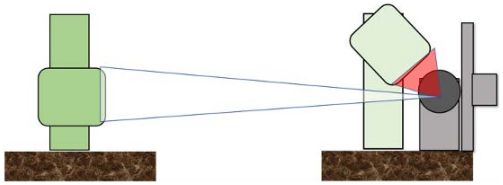
SCIENTIFIC HIGHLIGHTS

Role of solvent-host interactions that lead to very large swelling of hybrid frameworks / **Science 2007**

Hidden diversity of vacancy networks in Prussian blue analogues / **Nature 2020**

Metal-organic magnets with large coercivity and ordering temperatures up to 242 °C / **Science 2020**

Thermal unequilibrium of strained black $CsPbI_3$ thin films / **Science 2019**



The Swiss-Norwegian Beamlines at ESRF

FOR MORE INFORMATION
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BM31
Materials chemistry studied by operando multi probe synchrotron techniques

APPLICATIONS

Operando heterogeneous catalysis
Multi probe time and space resolved studies

Operando fuel cell, batteries and photo-electrochemistry

Porous materials
Sorption-desorption and separation processes

Material synthesis
From chemical template formation through nucleation to nano-crystalline phase

Environmental chemistry

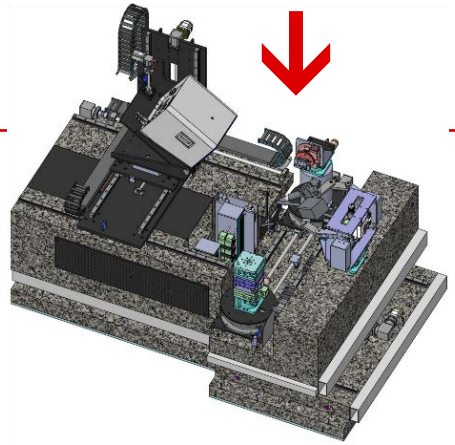
INSTRUMENTATION AND EXPERT SUPPORT

Combined EXAFS and Powder diffraction
Structure, stability and performance on the same sample under the same conditions

EXAFS and XANES
Valence states and coordination environment, fast and in-situ on multiple edges

Powder diffraction
Structural analysis, high resolution and high intensity measurements, fast in-situ data collections

COMING IN 2022
Total scattering/PDF *in combination with all above techniques*



SCIENTIFIC HIGHLIGHTS

The unique interplay between copper and zinc during catalytic carbon dioxide hydrogenation to methanol / **Nature Communications 2020**

Selective, Fast-Response, and Regenerable Metal–Organic Framework for Sampling Excess Fluoride Levels in Drinking Water / **Journal of the American Chemical Society 2019**

Bismuth vanadate and molybdate: Stable alloying anodes for sodium-ion batteries / **Chemistry of Materials 2017**

Polymer Lamellae as Reaction Intermediates in the Formation of Copper Nanospheres as Evidenced by In Situ X-ray Studies / **Angewandte Chemie International Edition 2020**

Molybdenum Carbide and Oxycarbide from Carbon-Supported MoO_3 Nanosheets: Phase Evolution and DRM Catalytic Activity Assessed by TEM and in situ XANES/XRD methods / **Nanoscale 2020**

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FOR MORE INFORMATION
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