



Name of the organization

Empa Switzerland, Eidgenoessische Materialspruefungs- und Forschungsanstalt

Name of the infrastructure / laboratory

Laboratory for Solid Hydrogen Storage Materials (Lasy), Empa

Address and country of the infrastructure / laboratory

Empa, Laboratory Hydrogen & Energy, Überlandstrasse 129, CH 8600 Dübendorf

Person responsible of the access / Contact person

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Main field of activity of the infrastructure / laboratory

► Hydrogen Production & Distribution

Short description of the infrastructure / laboratory

(a) Synthesis of Hydrogen storage materials via solid state preparation methods such as ball-milling. (b) Characterisation of Hydrogen storage materials via state of the art characterization methods such as volumetry. A variety of techniques can be offered to evaluate the key parameters of hydrogen storage materials, such as surface area determination by nitrogen adsorption measurements at 77 K: BELSORP-max (BEL, Japan), structural characterization by Raman spectroscopy as well as by in situ X-ray diffraction in various atmospheres (H₂, H₂O), and temperatures up to 800°C (Bruker D8). Gravimetric measurements are possible in inert atmosphere or under hydrogen of up to 200 bar in a modified RUBOTHERM magnetic suspension balance. The chemical composition of the desorbed gas are measured by thermal desorption mass spectroscopy (Balzers). The measurement of surface compositions is made possible by an X-ray photoelectron spectrometer (Specs). All sample preparation, handling and measurements are performed without contact to air.

A particular highlight is the possibility of combining different characterization tools, such as:

XRD and simultaneous volumetric sorption analysis / Gravimetry with simultaneous gas analysis by infrared spectroscopy and mass spectroscopy / Gravimetry with in-situ Raman spectroscopy / X-ray photoelectron spectroscopy and simultaneous gas analysis by mass spectroscopy.

Main research area(s) of the infrastructure / laboratory

Hydrogen storage, hydrogen production, synthetic fuels, batteries, surface science, materials synthesis and characterization, electrochemistry

Instruments and tools available for the above mentioned research

Standard solid state preparation methods (ball-milling) / XRD and simultaneous volumetric sorption analysis / Gravimetry with simultaneous gas analysis by infrared spectroscopy and mass spectroscopy / Gravimetry with in-situ Raman spectroscopy / X-ray photoelectron spectroscopy and simultaneous gas analysis by mass spectroscopy.

