

**Name of the organization**

Karlsruhe Institute of Technology (KIT)

Name of the infrastructure / laboratory

MHsyn

Address and country of the infrastructure / laboratory

Institute of Nanotechnology (INT)

Hermann-von-Helmholtz Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

Person responsible of the access / Contact person

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Main field of activity of the infrastructure / laboratory

► Hydrogen Storage

Short description of the infrastructure / laboratory

A metal organic laboratory is available to synthesize air sensitive compounds by chemical methods. High temperature synthesis can be performed in specially designed autoclaves. Separation procedures for clean-up of products and desolvation are established, all for working under strictly inert conditions. For mechanical synthesis, high energy ball mills are available. Reactive milling under pressures up to 150 bar is possible. All synthesis procedures are accompanied by state-of-the art characterization methods in order to guarantee chemical purity, microstructure, and H storage capabilities of the product. The above mentioned techniques allow synthesis of new and state-of-the art materials. One additional possibility is to synthesize the hydride in isotope-labelled form which is necessary for sophisticated characterization methods using neutrons, for example.

Main research area(s) of the infrastructure / laboratory

A variety of synthesis methods in a unique combination of chemical and mechanical techniques. In particular, the above mentioned techniques allow synthesis of new and state-of-the art materials. One additional possibility is to synthesize the hydride in isotope-labelled form which is necessary for sophisticated characterization methods using neutrons, for example.

Instruments and tools available for the above mentioned research

A metal organic laboratory with 4 lab hoods which are fully equipped with Schlenk lines, 5 high energy ball mills with milling vials from 80 ml to 20 L and a big and powerful high energy vibration mill (SIEBTECHNIK GmbH) with rotational speed up to 1200 rpm is installed in a tailor-made glove box in order to synthesize and handle large amounts of hydride material under strictly inert conditions. Thus, 1-2 kg nanocompositic hydride material can be produced per batch.



High energy ball mills



High energy vibration mill