

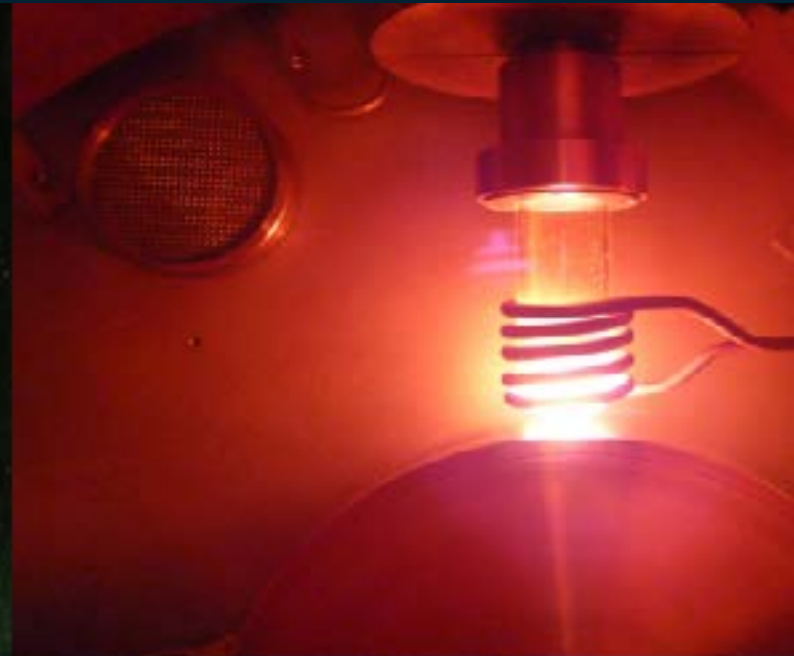
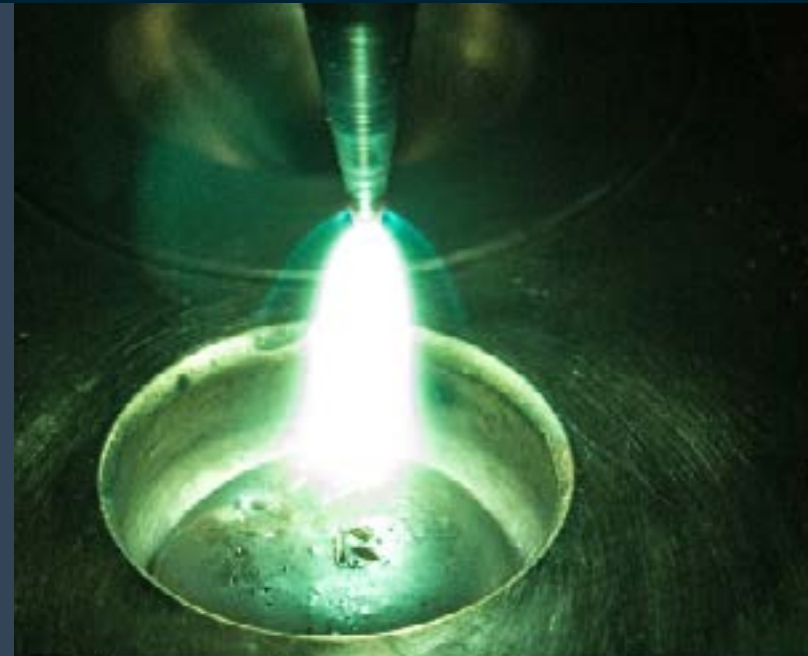
MATERIALS TECHNOLOGY

CONTACT

Dipl.-Ing. Jürgen Gassmann
Head of Department Magnetic Materials
Phone +49 6023 32039-814
juergen.gassmann@isc.fraunhofer.de

Fraunhofer Project Group for Materials Recycling and
Resource Strategies IWKS
Rodenbacher Chaussee 4
63457 Hanau, Germany

www.iwks.fraunhofer.de





MATERIALS TECHNOLOGY

Diminishing resource capacities are of major importance regarding the development of technical materials for high-end applications. Limited resources not only strongly affect the price but also a continuous supply with the desired raw materials is at risk. Hence, the use of primary raw materials should be kept at minimum level or even completely eliminated. The Materials Technology in the Fraunhofer Project Group for Materials Recycling and Resource Strategies IWKS focuses on the research and development of technical materials having new or improved properties while keeping in mind with due regards to resource conservation, energy saving and environmental protection. In consultation with you we develop and optimise materials for your specific application with regard to an intelligent use of raw materials. Their for our project group is equipped with the latest state-of-the-art facilities, covering a broad spectrum of materials processing technologies. Our portfolio ranges from classical heat treatment, melting of alloys in an arc furnace, generation of amorphous or crystalline structures by rapid solidification or hydrogen treatment.

Your and our goals

We design individual solutions for your company in the area of materials optimisation against the background of resource efficiency and support you in your material development methods. We implement new pilot lines, analyse your processes and work out proposals to enhance their efficiency. Our know-how and our facilities are at your disposal.

Target groups and industries

We work across industries for major companies as well as small and medium-sized enterprises in the following sectors:

- automobile manufacturers
- automotive suppliers
- magnet manufacturers
- environmental and recycling industry
- landfill operator
- disposal companies
- electronics industry and suppliers
- electric motor manufacturers
- machinery and plant engineering
- metal industry
- and many more

Our competences

The Materials Technology is subdivided in six technological sections. Within these sections we develop resource-efficient functional materials with optimised properties for each particular application. In the subdivision for crystalline and amorphous structures we develop rapidly solidified materials like e. g. magnetic materials with properties depending on the starting material. Thus, we use among others the melt spinning technique.

In the field of hydrogen treatment we possess miscellaneous equipment to expose alloys or entire composite bodies to hydrogen of various pressures and temperatures. Therefore customer-specific questions can be covered over a wide pressure and temperature range. The resulting effect of the hydrogen on the object will be studied by state-of-the-art analysing techniques.

Many material properties and thus the application depend on their thermal history. The subject area of heat treatment focuses on this topic and develops optimised heat treatment procedures for specific materials. A particular activity of this section is for example the production of metals and ceramics by powder metallurgical processes.

In the technological sector of melting of alloys, alloys and high melting precious metals are melted in an inductively heated melting furnace in vacuum or under inert atmospheres. For further processing the melt can be casted into special moulds or granulated in a water bath. Additionally high melting metals can be smelt in an arc melter at temperatures up to 3500 °C.

For manufacturing powders of hard materials and oxide powders as well as rare earth element alloys advanced target and jet milling techniques which are unique in Europe can be used. They offer the advantage of contamination-free grinding processes and the possibility to vary grain size and particle distribution.

Within the forming processes we use diverse techniques to manufacture dense mold bodies from powders. Depending on the requirements for the mold body cold isostatic pressing, transversal field pressing or hot pressing can be utilised.

We offer

- controlled generation of micro- and nanocrystalline or amorphous structures by rapid solidification
- pulverisation of REE-containing materials
- recycling / processing of REE-containing materials
- contamination-free grinding of ductile powders down into the low μm range
- manufacturing of large-volume parts and tubular formations
- alignment and compressing of magnetic powders in transversal field
- sintering of powder metallurgical pellets or ceramic greenbodies also in an oxygen-free environment
- heat treatment of many different materials (a. o. annealing, hardening, tempering)
- melting and granulating of high melting (precious) metals, alloys and special materials in vacuum or under protective gas

Are you interested in a cooperation?

We will be pleased to advise you. You may contact us by phone or e-mail. For more information, please visit our website.