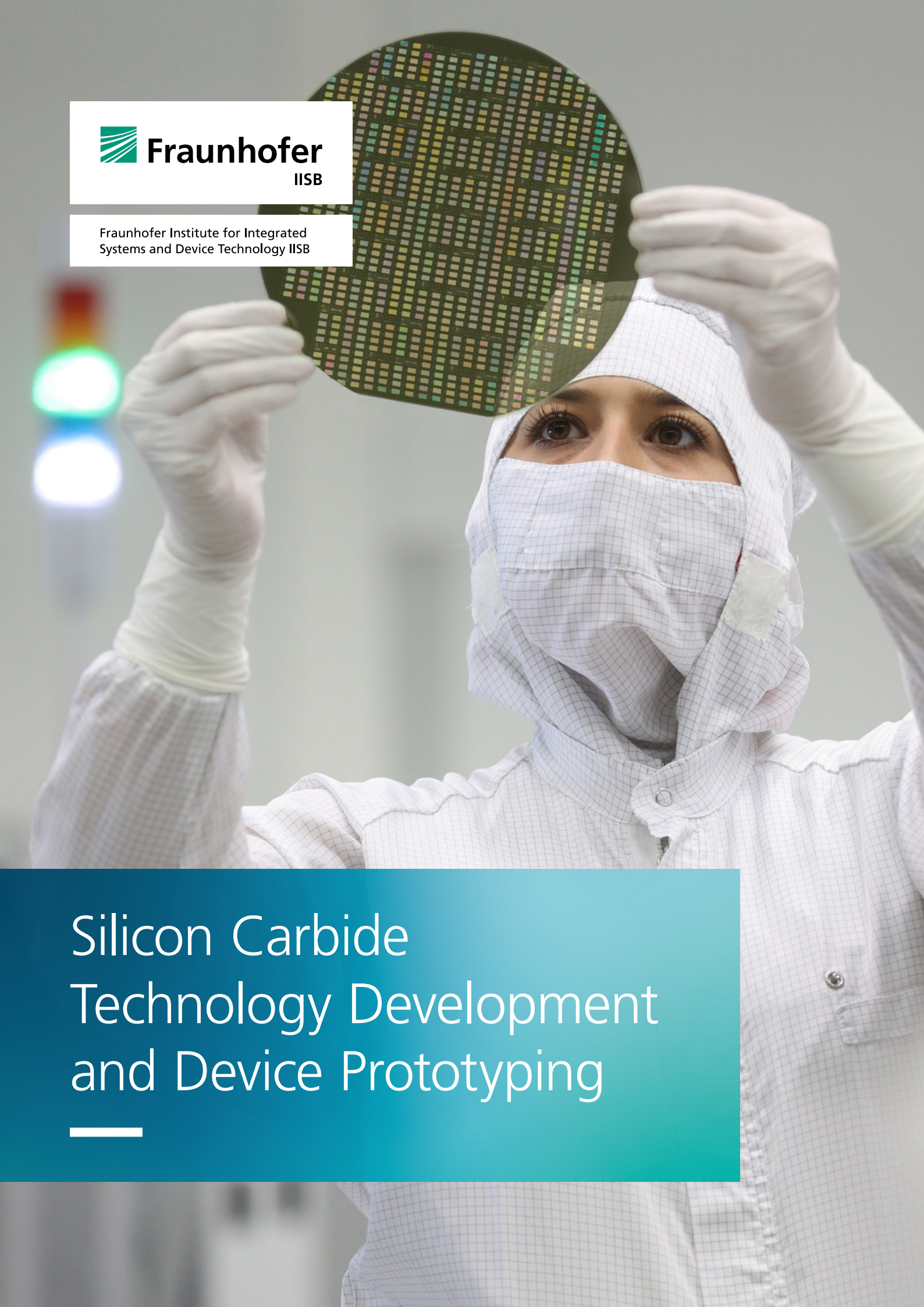
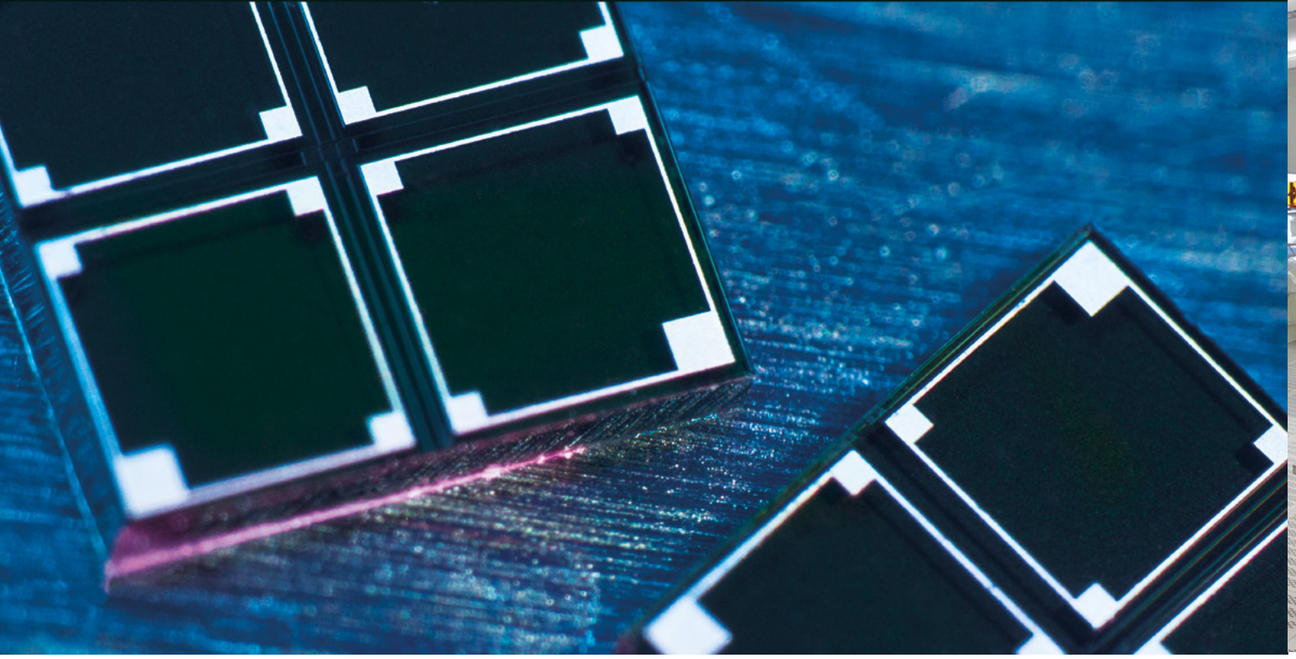


Fraunhofer IISB

Fraunhofer Institute for Integrated Systems and Device Technology IISB

Silicon Carbide Technology Development and Device Prototyping



2 x 2 UV diode sensor array

Panoramic view of the processing line for silicon carbide at Fraunhofer IISB

Customized Solutions in SiC

π-Fab: Electron Device Prototype Fabrication

The Fraunhofer Institute for Integrated Systems and Device Technology IISB conducts applied research and development in the fields of Power Electronics, Materials for Electronics, Electric Mobility and Energy Electronics.

Drawing on twenty years of ongoing cooperation with partners from SiC industry and research, Fraunhofer IISB has been established as Germany's hotspot for silicon carbide power device manufacturing on a 150 mm SiC line.

4H-SiC is the ideal semiconductor for the realization of high-voltage and high-power electronic devices due to its outstanding material properties.

Our mission is to share our long standing experience with the customers and to provide them with distinct SiC power device prototypes for newly arising markets.

Based on more than three decades of experience in silicon microelectronics research and development, the IISB has extended its activities to industry-oriented low-volume prototype fabrication of custom-tailored electron devices on Si and SiC.

The ISO certified prototyping services are offered and performed under the brand name π-Fab. Furthermore, π-Fab supports its customers with particular processing steps as well as whole process modules, including lithography, oxidation, LPCVD, ion implantation, annealing, dry and wet etching, metallization, diffusion, layer deposition, metrology, passivation, wafer thinning, laser anneal, PECVD and ALD, and others.

The modular construction allows for the integration and extraction of partially processed wafers at any given point within the process chain. Additionally, quality management and statistical process control form the frame for meeting our customers' individual requirements.

Flexibility as a matter of principle

The unique characteristic of π-Fab is a high flexibility in wafer material and size. 150 mm and 200 mm silicon wafers are handled by default, further diameters on request. The process line is based on a 0.8 µm Si-CMOS technology. To keep the flexibility high, an advanced contamination control is available.

Moreover, special attention is turned to silicon carbide (SiC) device processing on 150 mm and 200 mm wafers. To realize all specific SiC process steps, such as epitaxy, ICP dry trench etching, growth of silicon dioxide, implantation at elevated temperatures, implant activation annealing, or ohmic contact alloying, additional equipment is provided in π-Fab.

The principle of flexibility is also exemplary for our complementing activities in nanostructuring and inorganic thin-film electronics. For this purpose, particular equipment, like nano-imprint and advanced FIB-preparation or glove boxes and extended sputtering tools, is available.

π-Fab is designed to cover issues of equipment assessment and optimization or manufacturing control for customers.

Core Competencies

- Simulation and modeling
- Homoepitaxy and defect engineering
- Device and circuit design
- Full power device manufacturing
- Wafer thinning and packaging
- Device characterization

SiC Power Device Prototypes

- Diodes (SBD, PIN, MPS)
- MOSFETs (planar, trench)
- Specific devices (bipolar, CMOS, sensor)
- Industry collaboration towards qualified high-volume foundries

Markets

- Battery electric vehicles (BEV) and electric vehicles (EV)
- Renewable energies (wind, solar)
- Power grid

Contact

Dr. Michael Jank
Head of Departement
Advance Research & Development
Tel. +49 9131 761-161
michael.jank@iisb.fraunhofer.de

Fraunhofer IISB
Schottkystrasse 10
91058 Erlangen, Germany
www.iisb.fraunhofer.de

Additional Information

SiC Services:
iisb.fraunhofer.de/sic