

Energy Materials & Test Devices

Development of new high-performance materials and efficient manufacturing processes

The Energy Materials and Test Devices department is located at the Fraunhofer IISB location in Freiberg, Saxony. Here, we operate the Fraunhofer Technology Center for High-Performance Materials THM in collaboration with Fraunhofer IKTS. Both institutes complement each other thematically within the THM and work together closely in joint projects.

In cooperation with the Institute of Applied Physics (IAP) at the TU Bergakademie Freiberg, we investigate new, high-performance electronic materials and related efficient process technologies for the processing and characterization of electron devices.

Our focus is on gaining a profound understanding of fundamental material properties and physical phenomena. Based on this knowledge, we develop new manufacturing processes and integration methods for the requirements of our customers in industry and research.

Within the value chain for power electronics at Fraunhofer IISB – from semiconductor materials to power electronic systems – we see ourselves as the link between material development and the final electron device or electrical energy storage system.

*Optical characterization using
a spectroscopic ellipsometer
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hofer IISB*

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[www.iisb.fraunhofer.de/
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Battery Materials

- Aluminum-ion-based cell chemistry
- Cell manufacturing and electrochemical characterization
- Structural characterization

Our materials research is accompanied by comprehensive analysis, where the materials are examined in their initial state, under operando conditions and post-mortem. This enables a better understanding of the energy storage process, aging and failure mechanisms.



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Positioning and adjustment on the goniometer table
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Spectroscopy and Test Devices

- Semiconductor test devices
- Electrical characterization and spectroscopy

We offer electrical characterization of devices at wafer level by IV, CV measurements, determination of interface traps and in-depth electrical defect spectroscopy for small samples to determine the electrically active defect levels. We structure and process customer-specific test devices in the clean room at TU Bergakademie Freiberg.



www.iisb.fraunhofer.de/spectroscopy-testdevices



Automated wafer prober © Daniel Karmann / Fraunhofer IISB

Operando and In-line Analysis

- Optical semiconductor characterization
- Structural semiconductor characterization
- Operando and in-line analysis

We have in-depth expertise in characterizing the optical, structural, physical, and chemical properties of various crystal and wafer materials. This allows us to perform service measurements within a short return time. Operando characterization enables testing of device performance and reliability.



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Confocal micro-Raman measurements providing both a high spatial and spectral resolution © Daniel Karmann / Fraunhofer IISB