We are one of the leading manufacturers of materials for the assembly and packaging of devices in the electronics industry. We develop sophisticated materials solutions for consumer electronics and computing, automotive, LED, power electronics and communications.

Our core competences include bonding wires, assembly materials, thick film pastes as well as roll clad strips and substrates, and their integration into perfectly matched systems.
In today’s highly competitive and fast-paced markets, short lead time and development process are your key to remain competitive. Customer expectations on device features and tough price competition are ever increasing.

To succeed and be ahead of your competition, it is essential to optimize your design and processes, shorten your development cycles which in turn reduce costs, and also mitigate risks in all aspects. Our mission is to help you fulfill all requirements at maximum yield.

With a good combination of material expertise and technological know-how, our team can look into your processes and challenges, and develop high-quality solutions that strengthen your competitiveness.

We are your ideal partner to achieve your business objectives and guide your business to greater success.
Electronic devices consist of many materials: substrates, connectors, active and passive components, solders, adhesives, bonding wires, insulation and molding compounds and housings. When these materials are combined in a single device, complexity increases. Different suppliers make it even more complex.

We dissolve these issues by creating perfectly matched solutions that minimize complexity and compromises. With our expertise, we provide you with innovative materials as well as sets or systems of matched materials.

We also support you with excellent engineering services. In order to verify the quality of our tailored solutions we offer extensive prototyping, testing and qualification.

It takes deep materials knowledge in combination with systems know-how, testing expertise and manufacturing process experience to solve technical challenges. Therefore, outsourcing of the material system design to Heraeus experts creates a double advantage. On the one hand you are getting a better, smaller, more reliable, environmentally-friendlier, easy-to-manufacture and integrate electronic component. On the other hand you are gaining the freedom to concentrate on other development tasks at the same time.
MANAGING YOUR CHALLENGES

Time to market is extremely important in the fast growing electronics market. With each new technology generation, electronic devices need to deliver higher performance and greater functions in a smaller form factor. Development targets are to reduce device size and weight, improve reliability and heat dissipation, and also to ensure compliance with global environmental regulations. Heraeus is a reliable partner to overcome these challenges.

Shorter time to market
It is crucial to deliver new solutions fast and ideally be a first mover on the market. By partnering with Heraeus, we can support with our material expertise and shorten your time to market. We have the capability to match all materials in a perfectly matched system with optimized interfaces between the materials, enabling us to develop and deliver better solutions in shorter time.

Demand for reliability
The operational life span of an electronic component should outlast the operating time of the device it is used in. Degradation mechanisms must be considered in the design of a component to make it as robust as possible against thermo-mechanical stress and harsh environmental conditions. It takes deep materials knowledge in combination with systems know-how, testing expertise and manufacturing process experience to simulate long-time operating spans.

Miniaturization and weight reduction
Demands on the performance and functionalities of consumer devices in a smaller space is ever increasing. Smaller components require less material, saves space and in most cases are lighter. It also saves costs, especially if precious metals are involved.

Thermal management
The heat caused by power losses needs to be dissipated. This requires efficient management of thermal energy, otherwise chips can be damaged and service lifetime lowered. Our matched materials systems offer unique advantages as our development team can work with the specification data of the whole system.

Legal compliance requirements
In order to improve environmental protection and sustainability, legislations such as RoHS, ELV, REACH and others have a growing influence on the design of technical solutions. It is important to substitute legislation critical materials, however, alternatives often do not offer the same absolute performance. A broad spectrum of materials knowledge is required to develop solutions with a similar outcome, good manufacturability and full compliance with the law.
From stand-alone materials to matched materials solutions, we support applications in markets like automotive, consumer electronics, communications, LED, and power electronics.

Our core competencies include bonding wires, adhesives, solder materials, sinter materials, thick film pastes, metal substrates, and metal ceramic substrates.

THICK FILM MATERIALS

Small design spaces, harsh conditions and requirements for reliable circuits are the challenges of many industries including the automotive sector, medical devices, aerospace, telecommunications, and consumer electronics. Heraeus Thick Film Materials provide the solutions needed across these broad application ranges.

HYBRID PASTES
Passive Component Pastes
Paste for Fuel Senders

THICK PRINTED COPPER
Sensor Pastes
LTCC Materials
Pastes on Steel

PASSIVE COMPONENT PASTES

SENSOR PASTES

LTCC MATERIALS

PASTES ON STEEL

METAL CERAMIC SUBSTRATES - Condura®

Comprehensive portfolio of metal ceramic substrates to optimally address the diverse requirements of the power electronic industry from low-power applications up to the most demanding ones.

- **Condura®.classic**
  - DCB-Al₂O₃ substrates (direct copper bonded alumina)
- **Condura®.extra**
  - DCB-ZTA substrates (zirconia toughened alumina)
- **Condura®.prime**
  - AMB-Si₃N₄ substrates (active metal brazed silicon nitride)

Metal Substrates

Heraeus supplies roll clad strips and metallic substrates which meets all requirements of miniaturization. Our highly engineered processes create very clean and functional products with very narrow tolerances. All solutions are designed with high robustness and high conductivity, while being able to fit into tight spaces effortlessly.
Heraeus offers conductive and non-conductive adhesives for electronic component mounting applications. The materials are matched to the common processes used to mount components with excellent printing and dispensing properties. Our solutions simplify manufacturing processes and increase efficiency.

**ADHESIVES**

Heraeus specializes in the manufacturing of interconnected solder materials with products ranging from solder powders to wires, for die attach and SiP applications in semiconductors, advanced packaging, SMT, and other components of the electronics industry. Our solutions meet the highest standards in quality and process stability; ensuring superior reliability.

**SOLDER MATERIALS**

Heraeus mAgic series of silver sintered pastes offers a robust lead-free and halogen-free die-attach alternative where high reliability is vital. Designed for applications which demand excellent electrical and thermal conductivity, mAgic is an attractive solution, especially for power electronics.

**SINTER MATERIALS**

**BONDING WIRES**

Heraeus offers a portfolio of bonding wires with materials ranging from gold to copper, exactly fitting to your different applications and requirements. For the selection of the ideal solution, our specialists with years of experience support you with their technical expertise and application know-how.

**Materials**
Due to continuous rise in power density, coupled with higher operating temperatures and demand for improved reliability, packaging materials are brought to their limits. Material improvement in one single layer would only lead to a small contribution and shift the weakest point to the next joining layer. It is necessary to work on solutions which take into account the whole stack of materials in the power module to enable significant performance improvement.

The new Heraeus Die Top System (DTS®) enables use of copper wire in combination with sinter technology. It enables easy processing and significantly improves the electrical, thermal and reliability performance of the die connection, and improves the whole module performance.

Benefits:

- Increase of die current capability vs. Al-wire by > 50%
- Increase of reliability vs. solder die attach/Al-wire of >10x or die shrink respectively
- Uniform temperature distribution across the die; avoiding hot spots
- Compatible for high temperature semiconductors, enabling junction temperatures of 200°C
Condura® +
Choose your plus

Heraeus Condura®+ offers a comprehensive solutions portfolio: for example, Condura® with pre-applied solder reduces complexity in production by eliminating the step of printing solder and cleaning of flux residues. At the same time it increases the yields and enables cost savings.

Condura® with pre-applied solder

Direct copper bonded alumina substrates with pre-applied flux-free solder pads for die attachment.

Thanks to the innovative die fixation dot, the soldering process is significantly simplified.

Benefits:

- 50% less soldering process steps
- No cleaning steps required
- Lower investment
- No solder or flux splatters
- Improved yield
- Lower production risks
- No need for solder-stop

Properties
- Ceramic thickness
- Customized warpage
- Copper thickness
- Surface finishing
- Laser scribing for singulation
- Customized dimples
- Grinding

Options
- Burr-free holes
- Data matrix code
- AOI
- Ultrasonic testing
- Customized packing

Processing
- Pre-applied solder
- Pre-applied sinter paste

Services
- Matching materials
- Design
- Thermal simulation
- Prototyping
- Active power cycling
- Testing
- Analytics

Materials Solutions 9
LET OUR SERVICES BECOME YOUR STRENGTH

Our state-of-the-art application center offers a range of services to develop customer solutions in Hanau, near Frankfurt (Germany). Over 25 developers enable fast development and an efficient use of resources in the value chain. The application center offers an infrastructure for simulation, design, prototyping, testing and qualification of material systems in power electronic modules on 730 m², thereof 110 m² ISO 8 clean room.

Our regional service labs in West Conshohocken (USA), Shanghai and Changshu (China) and Singapore are specialized in the needs of the local markets and guarantee a close proximity and quick response time for our customers.

Our R&D and services work in close cooperation with customers, universities, and research institutes.

Our service offer includes:

- Processing support
- Optimization of process parameters
- Electrical and mechanical design of power modules
- Prototyping of subassemblies and complete modules
- Destructive and non-destructive material testing
- Active and passive reliability tests
- Environmental tests
- Metallography and microscopy
- Thermal, thermo-mechanical and lifetime simulation

By using our comprehensive state-of-the-art equipment and tools the customers benefit from faster development with higher first-time success rates. Our service portfolio together with our experience in packaging solutions contribute to customer’s problem solving.
OUR WORLDWIDE LOCATIONS

Close to your development centers and factories we have experts located in Asia, US and Europe to grant fast reaction and easy access without language barriers.

Being ISO/TS 16949, ISO9001, and ISO 14001 certified allows Heraeus to offer an even higher level of service and it is our conviction to develop environmentally friendly products that meets RoHS, ELV and REACH compliance regulations.

PRODUCTION SITES
Hanau, Germany | Chisoda, Romania | West Conshohocken, USA | Kulaijaya, Malaysia | Changshu, China | Zhaoyuan, China | Incheon, Korea | Singapore

SERVICE LABS
Hanau, Germany | West Conshohocken, USA | Changshu, China | Shanghai, China | Singapore
A globally leading technology group, Heraeus is headquartered in Hanau, Germany. Founded in 1851, it is a family-owned portfolio company which traces its roots back to a pharmacy opened by the family in 1660. Today, Heraeus combines businesses in the environmental, energy, electronics, health, mobility and industrial applications sectors.

In the 2018 financial year, Heraeus generated revenues of €20.3 billion with approximately 15,000 employees (including staff leasing) in 40 countries. Heraeus is one of the top 10 family-owned companies in Germany and holds a leading position in its global markets.

With technical expertise, a commitment to excellence, a focus on innovation and entrepreneurial leadership, we are constantly striving to improve our performance. We create high-quality solutions for our clients and strengthen their long-term competitiveness by combining unique material expertise with leadership in technology.