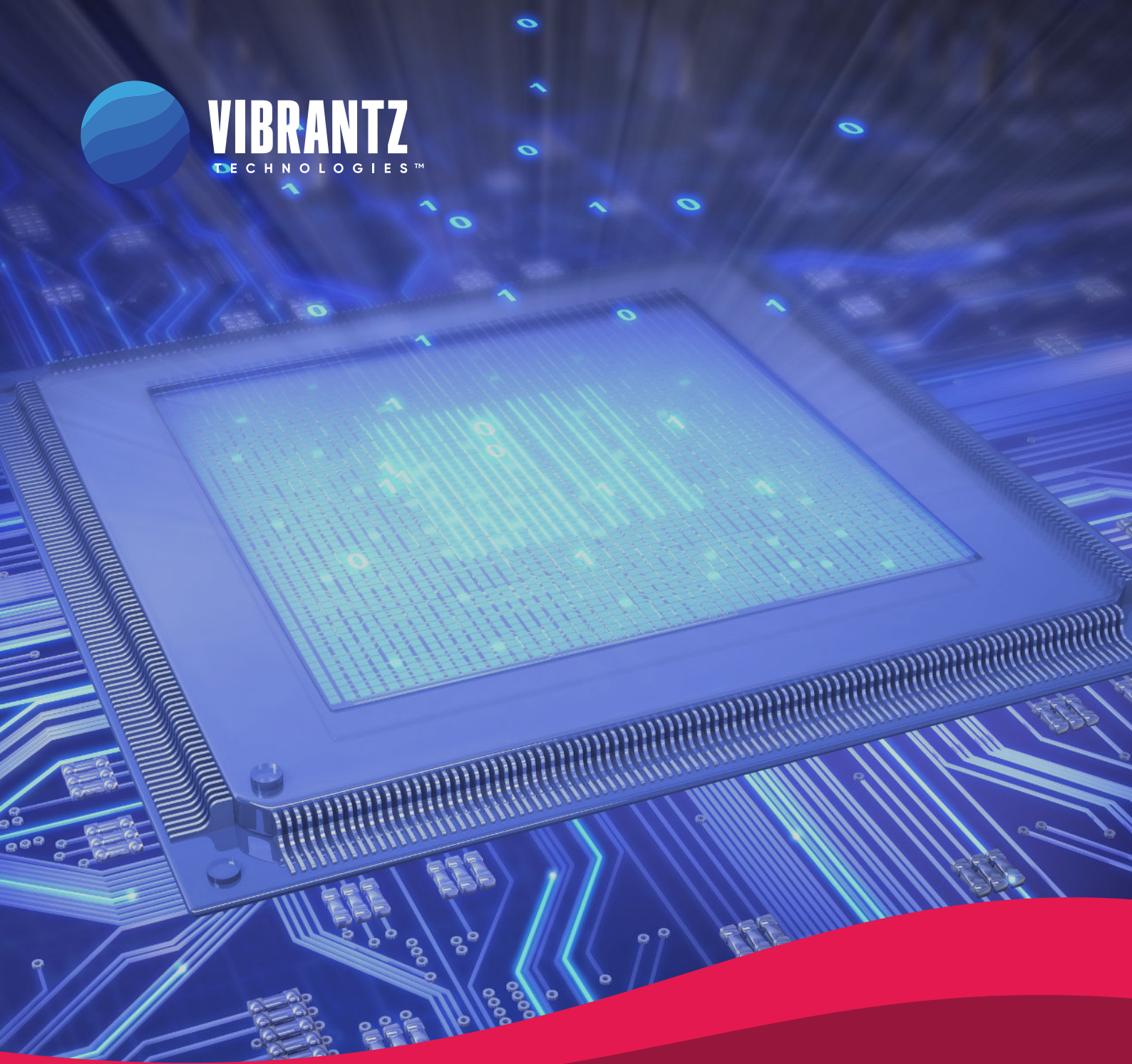


VIBRANTZ TECHNOLOGIES™

Sensor materials

Materials and engineered products

VIBRANTZ TECHNOLOGIES™

Elevating sensor technology, together

We are committed to helping you take on the latest challenges in sensor technology. Whether in automotive, medical or industrial applications, our high-performance materials deliver the reliability and precision that your products demand. Let's partner to power your next innovation. Contact us today to explore how we can support your sensor development goals.

Contents

Where sensor performance begins

Sensors are foundational components in various electronics, from aerospace, automotive and medical devices to smartphones and industrial process control and environmental monitoring systems. The materials used to create sensors must deliver exceptional performance and reliability, and Vibrantz is proud to provide high-quality materials that support sensor innovation across varied industries.

Our portfolio includes ceramic and electronic materials that are essential to sensor technology. These range from critical active sensing elements to thick film conductive pastes for passive interconnects on ceramic substrates, as well as thick film glass-pastes for sensor sealing and passivation.

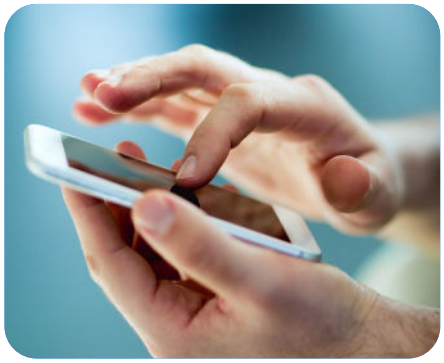
Markets we serve include:

Aerospace

Automotive

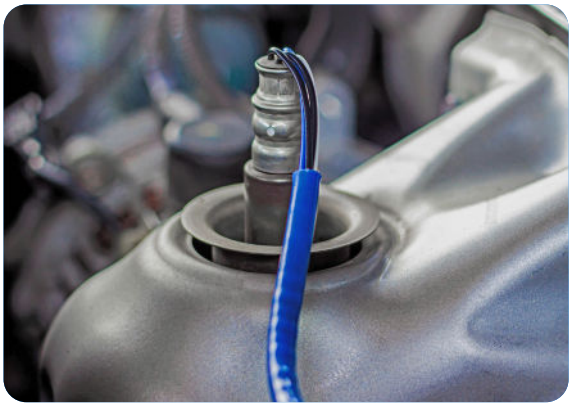
Environmental and industrial sensors

Medical technology



Smartphones and wearables

Sensor materials for the automotive sector



The automotive industry relies on advanced sensor technologies to enhance engine performance, meet strict emissions standards and improve overall safety and efficiency. Our specialized materials play a vital role in enabling these sensors to perform reliably in demanding conditions.

Technical overview of oxygen sensors

Oxygen sensors, for example, are critical for monitoring and optimizing combustion by measuring oxygen concentration levels in exhaust gases to precisely control the air-fuel ratio. These sensors typically use a ceramic zirconia sensor element coated with porous platinum electrodes that act as both conductors and catalysts. Platinum's excellent catalytic properties and high corrosion and temperature resistance make it indispensable, while some advanced designs also use gold conductors to improve signal stability and conductivity.

To support sensor production, we offer a comprehensive portfolio of HTCC materials, including platinum and gold-based conductor pastes, sealing materials and ceramic-compatible thick-film pastes—engineered for high-temperature stability, chemical resistance and strong adhesion to ceramic substrates. These solutions ensure long-term sensor performance and reliability, helping automotive manufacturers meet regulations and deliver a superior driving experience.

Application expertise

Our customers integrate oxygen sensors primarily in internal combustion engines, industrial furnaces and emissions control systems. Automotive original equipment manufacturers and Tier-1 suppliers use them to meet strict environmental regulations by ensuring optimal fuel efficiency and reducing NOx and CO emissions. In industrial settings, customers rely on the sensors for real-time feedback in high-temperature environments, enabling precise control of oxygen levels to maximize energy efficiency and minimize waste. High-performance materials like platinum and gold ensure long-term reliability under extreme conditions, which is critical for minimizing downtime and maintenance costs in mission-critical operations.

Common automotive applications

- **Oxygen sensors**
- **NOx sensors**
- **Particulate matter (PM) sensors**
- **Fuel pressure sensors**
- **Camshaft and crankshaft position sensors**
- **Hydraulic pressure sensors**

Medical technology and healthcare sensors

Sensors are vital in supporting healthcare providers with diagnostic accuracy, consistent patient monitoring and treatment efficiency. Vibrantz's materials are used in a variety of medical sensors used for diagnosis such as measuring temperature, pressure or biological signals. As the world population continues to grow and age, so does the demand for more advanced health monitoring and diagnostic devices. Our advanced sensor materials and high-quality ceramic and electronic materials ensure that medical devices are reliable, durable and can meet stringent industry requirements.

We offer a comprehensive portfolio of materials tailored to medical sensor applications, including gold-palladium (AuPd), gold and silver-based conductors, thick-film pastes for interconnects, as well as specialized PtAu and Au systems optimized for biocompatibility and stable performance. Our strain gauge pastes provide excellent mechanical stability and are widely used in pressure and force measurement. For temperature sensing, we offer materials suitable for thermistors and RTDs (resistance temperature detectors), ensuring accurate and repeatable readings even in critical care environments.

Common medical and healthcare applications

- **Blood sensors**
- **Strain gauges**
- **RTDs (resistance temperature detectors)**
- **Thermal scalpels**
- **Dosing devices and pumps**

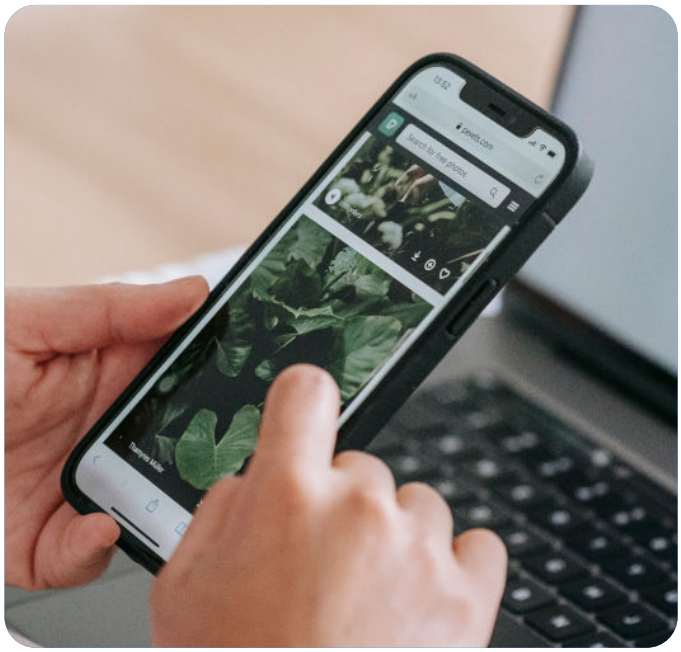
Smartphones and wearable devices

From smart phones to wearables, modern devices rely on a range of sensors to enhance functionality and user experience. Our sensor materials enable features like automatic adaptive displays, fitness tracking and secure access. Engineered to meet the demands of next-generation devices, our materials are foundational in touch sensors, biometric sensors and mobile electronics.

We offer a wide range of high-performance materials tailored for use in compact and high-frequency environments, including flexible circuitry, polymer coatings and thick-film pastes for sensor interconnects. Our sealing glasses and wafer-compatible materials ensure long-term device stability, while discrete components and advanced dielectrics support efficient signal processing. For wireless communication and filtering, we supply materials such as M8 and CCF8 high-frequency filter materials and antenna-grade dielectrics optimized for miniaturized designs.

Common compact and high-frequency applications

- **Touch screen sensors**
- **Accelerometers and gyroscopes**
- **Fingerprint sensors**
- **Light sensors**
- **Temperature sensors**

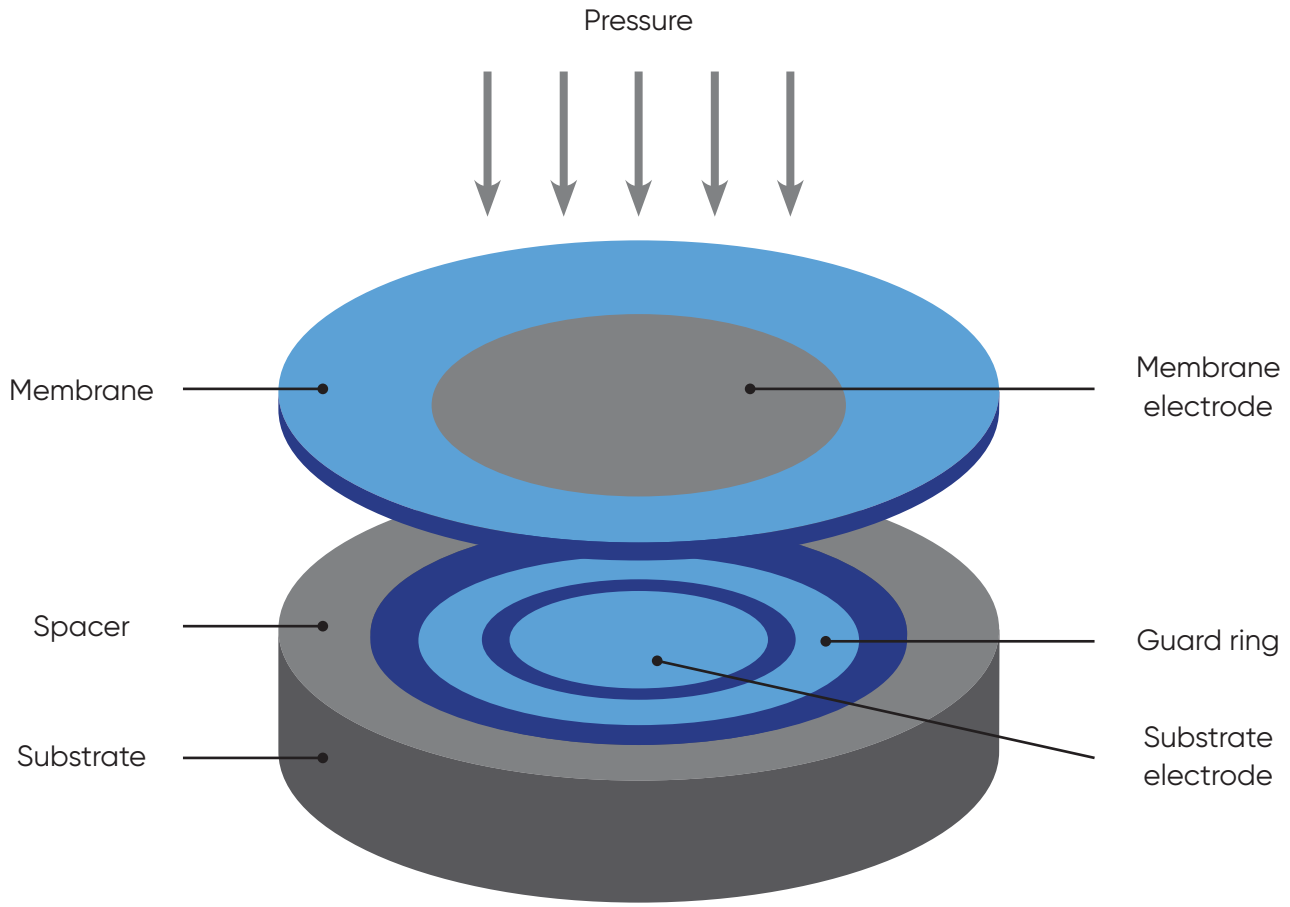


Strain gauges and piezoresistive sensors

Strain gauges and piezoresistive sensors are widely used for measuring physical strain, pressure and deformation in industrial and medical applications. Vibrantz provides specialized materials for strain gauges that offer high precision and reliability. These sensors are used in pressure monitoring, force measurement and structural health monitoring. Our materials provide unparalleled accuracy and longterm performance in challenging environments.

Examples of key applications include:

- **Pressure sensors:** Monitor fluid or gas pressure in industrial systems
- **Force sensors:** Measure applied force in mechanical systems or medical devices
- **Structural health monitoring:** Detect stresses and strains in construction and aerospace materials



Temperature sensors and thermocouples

Temperature measurement is essential across various industries. Vibrantz provides materials for automotive, aerospace, industrial and medical sectors, ensuring accurate temperature sensing in demanding environments. Our materials support thermocouples for high-temperature processes and resistance temperature detectors (RTDs) for precise control, delivering reliable performance even in extreme conditions.

We offer specialized platinum-based pastes, designed for optimal performance in RTD and thermocouple applications. These materials deliver excellent stability, linearity and long-term resistance consistency. Depending on customer needs, we supply both standalone RTD platinum pastes and systems tailored for thick-film sensor integration on ceramic or other high-performance substrates.

Vibrantz thick film NTC and PTC thermistor pastes are another option for relatively lower temperature sensing applications.

Applications include:

- **Thermocouples:** Measure temperature in engines, furnaces and high-temperature environments
- **RTDs:** Deliver highly accurate temperature readings in industrial and medical applications

Environmental and industrial sensors

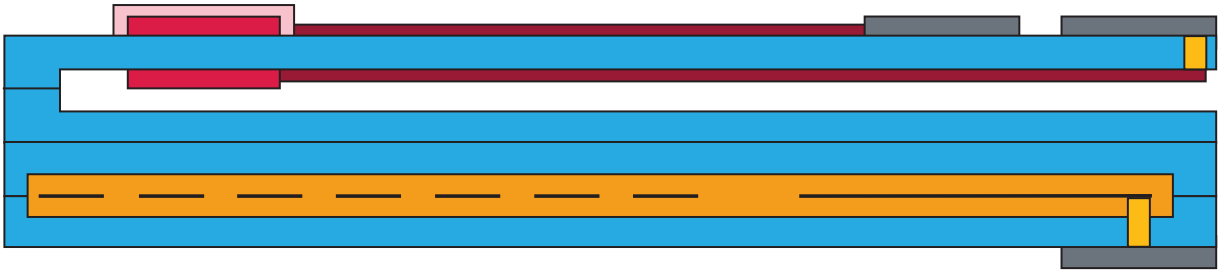
Accurate measurement of air quality, gas emissions and pressure levels is critical in environmental monitoring and industrial process control. Our materials play a key role in sensors that deliver precise readings, ensuring sensor durability and helping facilities maintain safety, compliance and environmental responsibility.

We offer a broad range of sensor materials including interconnect pastes, platinum-based systems for air quality monitoring, and Paragon materials designed for stable, high-performance signal pathways. In gas sensing, our iridium- and ruthenium-based resistive materials are used in ammonia sensors—especially relevant in food processing environments where precise detection is essential. For carbon monoxide and other oxidizing gases, gold-based powders are used as conductive interconnects due to their chemical inertness and long-term stability under corrosive conditions.

Applications include:

- **Gas sensors:** Detect ammonia, hydrocarbons, CO2 and other gases
- **Pressure sensors:** Monitor pressure in industrial machinery and environmental systems
- **Particle matter (PM) sensors:** Enable air quality monitoring in industrial and urban environments

Oxygen sensors – switching type



O2 Sensor Switching Type

Sensor compenents	Vibrantz products	Material	Product function
Zirconia tape	42022-CWM PSZ Tape	1430874	NTCs: sensor electrolyte as well as the ceramic sensor body
Porous overcoat	4599 Porous Zirconia Paste	1184975	Protective coat on sensor platinum electrode
Platinum/gold electrode	5370-G Pt HTCC Conductor	1184088	Oxygen sensor electrode
Platinum leads	371-A Pt HTCC Conductor	1430365	Connect electrode to terminal pad
Termination	5371-A Pt HTCC Conductor	1430365	Terminal pad for external contacts
Via fill	5375-C Pt HTCC Via-Fill Conductor	1184515	Interconnects platinum layers in the ceramic sensor body
Insulation dielectric	4530-B Alumina HTCC Dielectric	1184042	Insulate platinum heater resistor from the ceramic sensor body
Heater	5514-A Pt HTCC Conductor	1184084	Heater resistor to heat the sensor to its operating temperature
Fugitive paste	6444 Fugitive Paste	1184060	Make cavities in the fired ceramic sensor body. Also available as fugitive ink
Lamination adhesive	4431 Lamination Adhesive	1430988	If needed, adhesive to promote lamination between green tape layers

Also available: materials for wide-band oxygen sensors

Applications include:

- Zirconia tape
- Porous overcoat
- Platinum/Gold electrode
- Platinum leads
- Via fill
- Insulation dielectric
- Fugitive paste
- Lamination adhesive

VIBRANTZ
TECHNOLOGIES™

Why choose Vibrantz?

Expert customization
Tailored solutions for sensor materials in diverse industries

Proven reliability
For decades, Vibrantz has been trusted by leading manufacturers for material performance and durability in challenging environments

Innovative solutions
Our ongoing investment in technology allows us to continually advance in the field

Sustainable design
Our materials meet global environmental standards and support eco-friendly design

Global reach
Our worldwide presence with localized teams gives 365-degree support from concept to production