# **Industrial & Automotive** Components

# Fine Ceramic Components

Since its founding, Kyocera's track record in fine ceramics has been unmatched. We utilize our extensive resources in research, development and production to select the optimal raw materials and manufacturing methods for each new application. Breakthroughs and improvements in a wide range of industries are facilitated by the unique qualities of Kyocera's fine ceramics.



Fine ceramics have physical and chemical properties that are superior to metals and plastics. Kyocera utilizes that superiority to support continued technological advancement in the world's most vital industries.



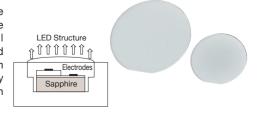
### **Ultra-High Vacuum Applications**

Kyocera components developed through ceramic-to-metal bonding technologies bring high reliability to ultra-high vacuum applications in a wide range of high-tech manufacturing and scientific research fields.



### Sapphire Substrates for LEDs

Substrates made from highly reliable single-crystal sapphire are used to form the gallium nitride layer necessary for the production of LEDs.



## Semiconductor Processing and **LCD Manufacturing Equipment**

Kyocera creates fine ceramics of unrivaled quality through continuous materials development. We use fine ceramics to produce structural components of extreme precision, heat resistance, and chemical stability — enhancing the wafer-fabrication process, enabling higher circuit densities and improving the production of LCDs.







#### **Information and Communications Components**

Kvocera's wide range of materials and high-precision manufacturing technologies contribute to the miniaturization and increased performance of communications devices.



# Automotive Components

Kyocera supplies a wide range of products for automotive applications that require ultra-high reliability. Our products support the rapid advancement of in-vehicle electronics: making cars smarter, safer, cleaner and more comfortable.



# **Ceramic Glow Plugs**

Our glow plugs are widely used in start-and-stop systems that require rapid heating, excellent durability at high temperatures. and reliability over extended duty cycles.



## **Piezoelectric Stacks** for Fuel Injectors

These components enable ultraquick response and precise control of fuel delivery to make diesel engine vehicles cleaner



### **Oxygen-Sensor Heaters**

Our sensor heaters reach operating temperature just seconds after a cold engine starts, ensuring cleaner exhaust by allowing emissions sensors to function almost immediately.



### **Camera Modules**

High reliability and excellent optical sensing help enhance vehicle safety and convenience.



# Fine Ceramics in Solid Oxide Fuel Cells (SOFCs)

A fuel cell causes hydrogen in utility gas to react with oxygen in the air, generating electricity and a heat source for hot water in residential and institutional applications. Kyocera has applied its fine ceramic materials and manufacturing technologies to develop an innovative cell stack for the fuel cell core, enabling the creation of a next-generation power system that offers significant improvements in efficiency, durability and carbon emissions.

