IOWN INTEGRAL

NTT R&D FORUM 2024

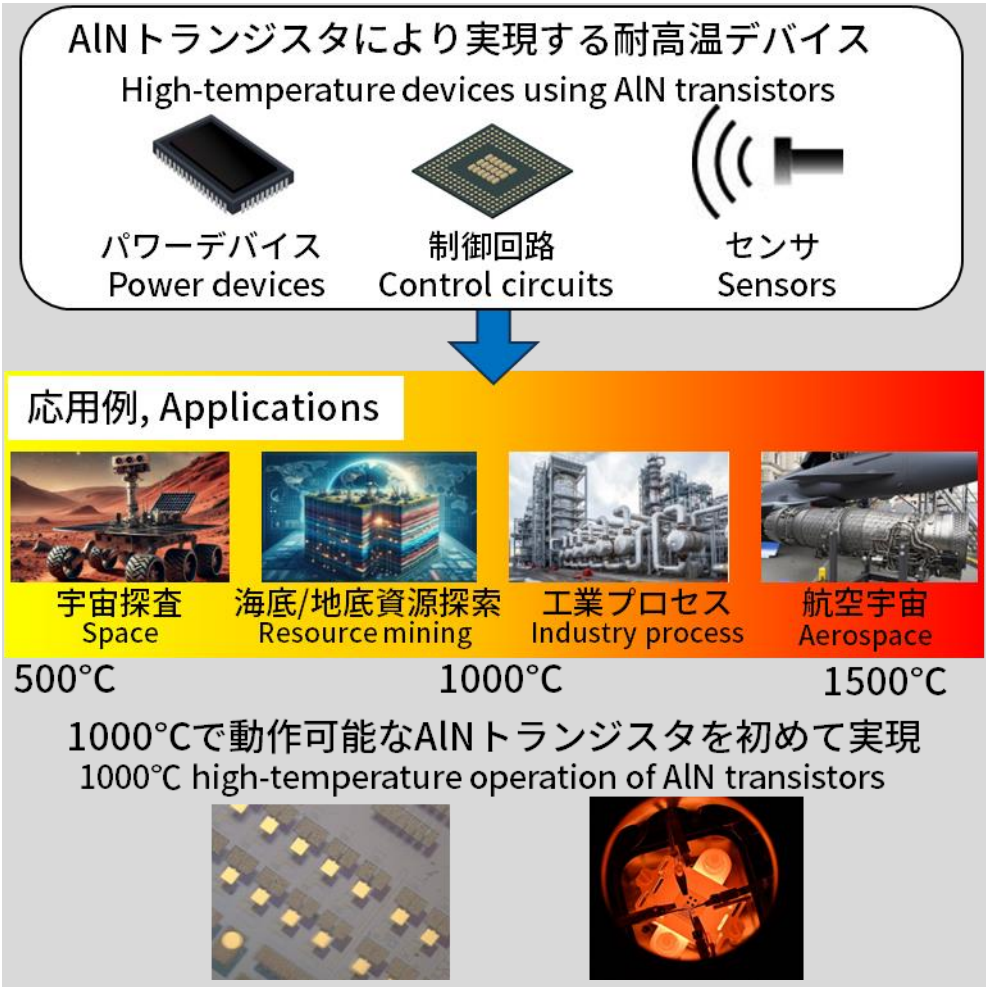
RESEARCH

γ07-01

High-temperature operation of AlN power-semiconductor devices

Toward electronic devices and circuits that stably operate at extremely high temperatures

#Green Transformation



///Technical Issue

Electron devices with conventional semiconductor materials can not stably operate because the heat-induced current is dominant under high-temperature conditions.

///Research Goal

Stable operation of AlN (aluminum nitride) -based electron devices under harsh environment.

---Technology

- Growth and electrical-conductivity control of high-quality AlN power semiconductor.
- Fabrication technique of AlN semiconductor devices.

---Novelty

- The highest on/off ratio of any semiconductor transistors was achieved at 1000°C, confirming the superiority of AlN transistors.

---Applicable Business

Energy field
AlN transistors can be applied as high-temperature resistant and low power loss devices such as sensors, power devices, and control circuits. Thes will be used in industrial equipment operating in high-temperature environments.
Availability: around 2040.

Exhibitors= NIPPON TELEGRAPH AND TELEPHONE CORPORATION Related URL=NTT News Release"The world's first demonstration of aluminum nitride transistor" (2022)
Contact URL