

R&D Activities & Achievements

The Proterial Group is focusing on creating new products and new businesses aimed at realizing a sustainable society. We are promoting R&D DX that uses digital technologies such as AI and Materials Informatics (MI) to tackle solving our customer's challenges, as well as manufacturing DX for achieving safe, high-quality workplaces that do not rely on people. We are conducting joint research with cutting-edge global research institutions in order to accelerate these efforts.

Key Themes and Achievements of Research and Development

The themes and key achievements of research and development are as follows. These achievements are anticipated to contribute to environmental and social issues such as product-weight reduction, fuel efficiency and energy conservation, and decarbonization in industrial infrastructure and electronics-related fields as well as automotive related fields, where the shift to electrification (xEV\*) is expected to continue.

Area	Key Themes and Achievements
New Materials and New Businesses	<div>Development of innovative materials that contribute to solving social issues, development of innovative production technologies that utilize AI and robotics, fusion of advanced analytical technologies and AI/MI technologies that revolutionize materials development across the entire company</div> <div>Key Achievements</div> <ul style="list-style-type: none"><li>Developed a technology that reduces CO<sub>2</sub> emissions by more than 20% when manufacturing cathode materials for lithium-ion batteries</li><li>Developed and commenced sales of ADMUSTER™-YAG™350AM, a high-hardness maraging steel additive manufacturing material</li><li>Developed ADMUSTER L61P powder, which uses Al6061, an aluminum alloy in the Al6000 series that enables metal additive manufacturing (joint development with the Singapore Institute of Manufacturing Technology, a research institute of Singapore's Agency for Science, Technology and Research)</li><li>Developed our own MI platform, D2Materi™.</li></ul>
Specialty Steel Products	<div>Development of materials, manufacturing methods, and related technologies for high-grade specialty steels, various rolling mill rolls, and metal 3D additive manufacturing for the fields of molds and tools, electronic materials, industrial equipment materials, aircraft and energy-related materials, etc.</div> <div>Key Achievements</div> <ul style="list-style-type: none"><li>Development of high-hardness, high-corrosion-resistant steel for blades</li><li>Developed titanium alloy foil for flexible displays</li></ul>
Functional Components and Equipment	Development of high-grade ductile cast iron products, heat-resistant cast steel for exhaust parts and ceramic honeycomb filter
Magnetic Materials and Applications/Power Electronics	<div>Development of high-performance magnets, high-frequency parts and materials for information terminals, amorphous metal materials, nanocrystalline soft magnetic materials, various other magnets and ceramic products, and their applied products</div> <div>Key Achievements</div> <ul style="list-style-type: none"><li>Established technology for NMx™-G1NH, a high-performance rare earth magnet that greatly reduces the amount of heavy rare earths used</li><li>Verified output exceeding 100kW, which can be applied to the traction motors of BEVs and PHEVs, using a ferrite magnet motor</li><li>Developed Laminated Bonded Amorphous Alloy Ribbon for Motor Cores</li><li>Developed "MS-FH" a Highly Heat-Resistant Magnetic Shielding Sheet</li></ul>
Electric-wire Materials	<div>Development of materials, manufacturing process technology and connection technology related to various electric wires and Magnet wire for industrial, vehicle/automotive, equipment, medical, etc., as well as electrical components and hoses for automobiles, industrial rubber, etc.</div> <div>Key Achievements</div> <ul style="list-style-type: none"><li>Applied the D2Materi™ materials informatics platform to the development of cable insulation materials</li><li>Developed the new GT-SNNS170 trolley wire and deployed it on the JR Shikoku Seto-Ohashi Line</li></ul>

Global Research & Innovative Technology Center (GRIT)

GRIT is Proterial's corporate research institute that works on creating new products and businesses aimed at realizing a sustainable society, without being constrained by existing products or businesses. We are promoting forward-thinking R&D and innovation with the aim of solving social issues.



\* xEV: A collective term for electric vehicles (EV), hybrid electric vehicles (HEV), and plug-in hybrid electric vehicles (PHEV)

Awards for Inventions

May 2023	Invention of a steel annealing method that does not utilize a furnace wins Asahi Shimbun Award at 2023 National Invention Awards
October 2023	Invention of highly reliable insulating silicon nitride substrates and circuit substrates receives the Tottori Prefectural Governor's Award at the Chugoku Region Invention Honors for FY2023
October 2023	"New mold material for plastic molding," which combines rust resistance with thermal conductivity, receives the Shimane Institute of Invention and Innovation Chairperson's Award in the Chugoku Region Invention Honors for FY2023
November 2023	Silicone sheath with superior sliding properties and its application product receives the Minister of Education, Culture, Sports, Science and Technology Award at the Kanto Region Invention Honors for FY2023

Ichimura Prize in Industry

March 2024	Received the Contribution Prize at the 56th Ichimura Industrial Awards for "Trolley Wire System with Fiber Optic Warning Function."
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Examples of Research and Development

Developed MS-FH, a high heat-resistant magnetic shield sheet

We have developed MS-FH, a new high-heat-resistant magnetic shield sheet that improves the heat resistance of the MS-F magnetic shield sheet, which uses the Nanocrystalline Soft Magnetic Material FINEMET®. In addition to having a higher heat resistance of up to 130°C, which is 50°C higher than the existing product, the thickness of the sheet has been reduced by approximately 40% compared to the existing product, contributing to making electronic devices smaller and lighter.



Applied the D2Materi™ materials informatics platform to the development of cable insulation materials

We have successfully applied our proprietary MI platform, D2Materi to the development of cable insulation materials. We have also used D2Materi in the development of actual cable insulation materials for rolling stock, and have confirmed that it greatly improves the speed of development of insulation material formulations.



Developed titanium alloy foil for flexible displays

Proterial Metals, Ltd. (wholly owned by Proterial, Ltd. ) has developed a titanium alloy foil for the back panels of flexible displays, which are attracting attention as a way to increase the screen size of smartphones. We focused on a titanium alloy (Ti-15-3-3-3), which is more flexible than stainless steel, and is non-magnetic and lightweight even after cold working, and developed it to improve durability, succeeding in developing a titanium alloy foil that is more durable than stainless steel when bent repeatedly, and that can reduce the bending radius to about two-thirds the size.

