

High-performance Materials for Realizing Customer Innovation

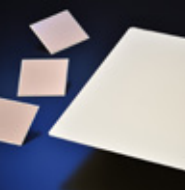
Focusing on structural and compositional control technologies centered on metals, the Proterial Group has created high-performance materials in collaboration with its customers. By reflecting the needs of our customers in every step from R&D to mass production, we help customers realize innovation. Moreover, this approach serves as the driving force for the sustained growth of the Group. By continuing to deliver unique, high-performance materials, the Group is working to solve social issues and secure sustainable growth.

xEVs

We play an important role in making xEVs smaller, lighter, more efficient, and more energy efficient. As a permanent magnet boasting the highest magnetic force in the world, the NEOMAX[®] neodymium magnet is contributing to improved performance and miniaturization with magnets developed by the Company in 1982. We have also started to propose the use of ferrite magnets that do not use heavy rare earths as a material for traction motors. Furthermore, we supply magnet wire, which is required to be highly efficient and reliable, for use in motors. Silicon nitride substrates, SiC epitaxial wafers, and FINEMET nanocrystalline soft magnetic materials are used in power semiconductors, which are key devices in xEV on-board chargers and other equipment. In addition, clad materials contribute to lighter, smaller and higher capacity lithium batteries. Proterial supports the evolution of xEVs with these high-performance materials.



NMF[™] ferrite magnets



Silicon nitride substrates



SiC epitaxial wafers



Magnet wire



Clad metals



FINEMET[®] nanocrystalline soft magnetic materials



NEOMAX[®] rare-earth magnets



Metglas[™] Amorphous Alloy



Smartphones

We are contributing to the realization of smartphones that are compact, lightweight, and power-efficient, while also being highly functional. Clad materials are used as heat sinks because they realize high strength and high thermal conductivity through the combination of stainless steel and copper. The nanocrystalline soft magnetic material FINEMET[®] contributes to noise reduction and also to highly efficient wireless charging. Rare earth magnets are used in speakers and vibration motors, contributing to size reduction.

Aircraft

The aircraft market is expected to broaden significantly over the medium- to long-term. With a view to the expanding market for aircraft engine components, we have made large investments in the past, including a 10,000-ton free forging press, a 24-ton vacuum induction melting furnace (VIM), and an 840-ton large ring mill. This is an area where the required level of technology, quality and management is extremely high, and it is also used in the H3 Launch Vehicle of the Japan Aerospace Exploration Agency (JAXA).



Aircraft engine components

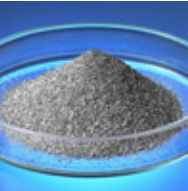


Power Generation and Distribution

Proterial is the world's leading manufacturer of amorphous alloys, which are metals that do not have a crystalline structure. Amorphous alloys are used as core materials in distribution transformers, pole-top transformers, industrial transformers, and transformers for solar power generation and wind power generation, etc. Amorphous alloy transformers demonstrate one-third to one-fifth the iron loss (no-load loss) compared to transformers with grain-oriented electrical steel plate cores, and thereby contribute to reductions in power consumption. In recent years, significant anticipation has therefore been placed on their application to motor cores.

Hydrogen-related facilities

Reducing carbon dioxide (CO₂) emissions is an important issue, and we are focusing on the realization of a hydrogen society as a solution to this. We will contribute to the realization of a decarbonized society by proposing solutions to the challenges of its realization with a product lineup that supports the “making”, “storing”, and “using” of hydrogen-related equipment, such as hydrogen storage alloys, high-strength alloys, and hydrogen embrittlement-resistant materials.



Hydrogen storage alloy



High-strength alloys/high-oxidation-resistant alloys



Hydrogen embrittlement-resistant materials



Corrosion-resistant, hydrogen embrittlement-resistant additive manufacturing material



Honeycomb-shaped catalyst for the methanation reaction (Under development)