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Magnetocaloric Materials Market Forecasts to 2032 – Global Analysis By Product (Sheets & Foils, Rods & Bars, Powders & Granules, and Other Products), Material Type, Magnetic Ordering, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Magnetocaloric Materials Market is accounted for $86.6 million in 2025 and is expected to reach $165.6 million by 2032 growing at a CAGR of 9.7% during the forecast period. Magnetocaloric materials are advanced functional materials that exhibit a reversible temperature change when exposed to a changing magnetic field, a phenomenon known as the magnetocaloric effect. These materials, typically rare-earth alloys, Heusler compounds, or transition-metal-based alloys, are pivotal in developing magnetic refrigeration technology. Offering an eco-friendly alternative to conventional gas compression cooling systems, they enable efficient, quiet, and environmentally safe refrigeration. Applications span household appliances, automotive cooling, medical cryogenics, and waste-heat recovery, driving innovation in next-generation energy-efficient thermal systems.

According to the U.S. EPA, magnetocaloric refrigeration systems offer a highly efficient, solid-state cooling alternative that eliminates the need for potent greenhouse gas refrigerants.

Market Dynamics:

Driver:

Rising demand for energy efficiency

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The increasing global focus on energy efficiency is a primary driver of the magnetocaloric materials market. These materials enable magnetic refrigeration systems, which are significantly more efficient and environmentally friendly than conventional gas-compression cooling. With governments and industries emphasizing sustainable energy solutions, adoption is rising in household appliances, data centers, and medical cooling systems. Spurred by the need to reduce carbon emissions and operating costs, magnetocaloric materials are positioned as a disruptive innovation driving the next generation of cooling technologies.

Restraint:

High cost of rare-earth elements

A key restraint in the magnetocaloric materials market is the high cost of rare-earth elements used in alloy production. Elements such as gadolinium and dysprosium are expensive to extract and process, limiting affordability for mass-market applications. Their price volatility, driven by limited supply sources, adds further risk for manufacturers. This cost barrier restricts adoption in cost-sensitive industries, where cheaper conventional cooling alternatives remain dominant. Unless cost-reduction strategies or alternative compositions emerge, high rare-earth material expenses will continue to hinder broader market penetration.

Opportunity:

Expansion in automotive cooling systems

The automotive industry presents significant opportunities for magnetocaloric materials, particularly in next-generation cooling systems. As electric vehicles (EVs) gain traction, efficient thermal management becomes critical for battery life and vehicle performance. Magnetocaloric refrigeration offers compact, efficient, and eco-friendly solutions that align with automotive sustainability goals. Increasing investments by automakers in innovative cooling technologies further support integration. Motivated by the shift toward electrification and green mobility, expansion into automotive cooling represents a lucrative growth frontier for the magnetocaloric materials market.

Threat:

Supply risk of rare-earth metals

The supply risk of rare-earth metals poses a critical threat to the magnetocaloric materials market. Global production of these metals is highly concentrated in a few countries, raising concerns over geopolitical tensions and trade restrictions. Such dependency creates uncertainty in raw material availability and pricing stability. Manufacturers relying heavily on rare-earth inputs face strategic vulnerabilities. Unless diversification of supply chains or substitutes are developed, the magnetocaloric market remains exposed to external risks, potentially stalling commercialization efforts and large-scale adoption.

Covid-19 Impact:

The COVID-19 pandemic had a mixed impact on the magnetocaloric materials market. Supply chain disruptions and halted manufacturing activities initially slowed development and deployment of magnetic refrigeration systems. However, the crisis highlighted the importance of energy-efficient and sustainable cooling, reinforcing long-term adoption potential. Research investments and collaborations resumed strongly in the recovery phase, especially across healthcare and automotive sectors. While short-term challenges delayed progress, the pandemic accelerated strategic focus on eco-friendly cooling, ultimately supporting future growth in magnetocaloric materials adoption.

The sheets & foils segment is expected to be the largest during the forecast period

The sheets & foils segment is expected to account for the largest market share during the forecast period, resulting from their broad application in cooling devices requiring efficient heat exchange. Their high surface area and versatility make them suitable for integration into household appliances, industrial refrigeration, and medical devices. Manufacturers favor sheets and foils for scalable production and cost-effectiveness compared to bulk forms. Propelled by growing demand in compact and energy-efficient systems, this segment is projected to dominate market adoption.

The rare-earth based alloys segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the rare-earth based alloys segment is predicted to witness the highest growth rate, propelled by their superior magnetocaloric effect and advanced cooling efficiency. Alloys such as gadolinium-based compounds are leading research and development initiatives due to their performance advantages. Increasing demand for high-efficiency refrigeration in data centers, EVs, and healthcare supports

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expansion. Despite high costs, technological progress and new alloy discoveries are expected to strengthen adoption, making rare-earth based alloys the fastest-growing segment in this market.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, attributed to strong manufacturing capacity, growing demand for efficient cooling technologies, and government emphasis on sustainable solutions. Countries such as China, Japan, and South Korea are investing heavily in magnetocaloric research and commercialization. Expanding automotive and electronics industries further support adoption. Coupled with cost advantages in material production, Asia Pacific's dominance is reinforced by rapid industrialization and the presence of leading manufacturers in the region.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR associated with strong R&D activities, advanced technological infrastructure, and rising adoption in niche applications. The U.S. and Canada are spearheading innovation in magnetic refrigeration, supported by collaborations between research institutions and commercial players. Growing focus on energy-efficient appliances and EV thermal management enhances regional growth prospects. Propelled by regulatory support and high investments in green technologies, North America is set to emerge as the fastest-growing region.

Key players in the market

Some of the key players in Magnetocaloric Materials Market include Magnoric, MAGNOTHERM, Kiutra, Vacuumschmelze, BASF, Cambridge, Electron Energy, Arnold Magnetic Technologies, Daido Steel, Hitachi Metals, Lynas Rare Earths, Adams Magnetic Products, Dexter Magnetic Technologies, GKN Powder Metallurgy, Neo Performance Materials, Shin-Etsu Chemical, TDK Corporation, and Steward Advanced Materials.

Key Developments:

In August 2025, BASF announced a breakthrough in its rare-earth-free magnetocaloric alloy, significantly reducing material costs for commercial magnetic refrigeration units.

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In July 2025, TDK Corporation launched a new series of high-entropy magnetocaloric alloys designed for ultra-efficient solid-state cooling in precision medical and laboratory equipment.

In June 2025, Vacuumschmelze unveiled its new manufacturing line dedicated to producing gadolinium-based magnetocaloric plates with enhanced durability and thermal cycling performance.

In May 2025, Neo Performance Materials secured a key patent for a novel magnetocaloric composite material that operates at room temperature with greater temperature span efficiency.

Products Covered:

- Sheets & Foils
- Rods & Bars
- Powders & Granules
- Other Products

Material Types Covered:

- Rare-Earth Based Alloys
- Transition Metal-Based Alloys
- Heusler Alloys
- Manganese-Based Alloys
- Other Material Types

Magnetic Orderings Covered:

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Ferromagnetic Materials

Paramagnetic Materials

Antiferromagnetic Materials

Applications Covered:

Magnetic Refrigeration

Heat Pumps

Waste Heat Recovery

Cryogenic Applications

Industrial Cooling Systems

Consumer Electronics

End Users Covered:

Residential & Commercial

Food & Beverage

Healthcare & Medical Devices

Automotive & Transportation

Regions Covered:

North America

US

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Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

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Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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