

Carbon Mineralization Market Forecasts to 2034 – Global Analysis By Feedstock (Industrial Slag, Fly Ash, Mine Tailings, Natural Silicate Rocks, Cementitious Materials, and Other Alkaline Materials), Mineral Type, Project Scale, Technology, Application, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Carbon Mineralization Market is accounted for \$2.8 billion in 2026 and is expected to reach \$9.8 billion by 2034 growing at a CAGR of 23.2% during the forecast period. Carbon mineralization refers to chemical processes that convert carbon dioxide into stable solid carbonate minerals through reaction with alkaline earth metals, primarily calcium and magnesium. These processes occur naturally during rock weathering but can be accelerated through engineered approaches, including ex-situ mineral carbonation reactors, in-situ injection into reactive geological formations, and integration with industrial waste streams. Carbon mineralization produces environmentally benign materials such as calcium carbonate that can be utilized in construction aggregates, cement supplements, and building materials. The technology offers permanent carbon storage with minimal long-term monitoring requirements due to the thermodynamic stability of carbonate minerals.

Market Dynamics:

Driver:

Construction material demand

The global demand for low-carbon construction materials is driving substantial interest

in carbon mineralization as a pathway for producing carbon-negative aggregates and cement supplements. The construction industry's significant carbon footprint creates pressure to identify alternative material sources. Mineralization-derived calcium carbonate can substitute for virgin limestone in concrete formulations. Major cement manufacturers are investing in carbon mineralization pilot projects to reduce product embodied carbon. Building certification programs increasingly reward materials with demonstrated carbon removal attributes.

Restraint:

Reaction kinetics limitations

The slow reaction kinetics of natural mineral carbonation processes present significant engineering challenges for achieving commercially viable throughput rates. Silicate minerals require energy-intensive pretreatment such as grinding and heat activation to achieve reasonable reaction speeds. The exothermic nature of carbonation reactions complicates process heat management at scale. These kinetic constraints elevate capital and operating costs compared to other carbon storage approaches. Research into catalytic acceleration and biological enhancement continues, but has not yet achieved commercial breakthroughs.

Opportunity:

Industrial waste valorization

The utilization of industrial alkaline waste streams, including steel slag, cement kiln dust, and coal ash for carbon mineralization presents significant opportunities for simultaneous carbon removal and waste management. These materials have already undergone energy-intensive processing that enhances their reactivity with CO₂. Industrial facilities can install carbon capture and mineralization systems on-site to create circular economy value chains. Waste-derived carbonates can be sold as construction materials, generating revenue. This dual-benefit approach improves project economics and supports industrial decarbonization goals.

Threat:

Alternative storage competition

Established geological carbon storage methods, such as saline aquifer injection and

enhanced oil recovery, compete with carbon mineralization for project investment and policy support. These alternatives currently offer lower costs and simpler engineering requirements. The oil and gas industry's existing CO₂ handling infrastructure favors conventional storage pathways. Regulatory frameworks are more developed for geological injection than mineralization. Carbon mineralization must demonstrate superior permanence and co-benefit advantages to capture market share from these established approaches.

Covid-19 Impact:

The COVID-19 pandemic disrupted field trials and construction activities for carbon mineralization demonstration projects. However, the crisis accelerated corporate sustainability commitments that include supply chain decarbonization and carbon removal targets. Post-pandemic infrastructure stimulus packages in major economies incorporated green building material priorities. The construction industry's focus on resilient and sustainable supply chains supports interest in carbon-negative materials. Continued investment in clean technology research maintains development momentum.

The natural silicate rocks segment is expected to be the largest during the forecast period

The natural silicate rocks segment is expected to account for the largest market share during the forecast period, due to the vast global abundance of suitable mineral deposits, including olivine, serpentine, and basalt formations. These rocks contain the magnesium and calcium silicates necessary for carbonate mineral formation. Mining and processing infrastructure for industrial minerals can be adapted for carbon mineralization feedstock supply. The scalability of natural rock resources supports gigatonne-scale carbon removal potential. Regional geological surveys are identifying optimal deposit locations for project development.

The industrial alkaline residues segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the industrial alkaline residues segment is predicted to witness the highest growth rate, driven by the convergence of waste management economics and carbon removal demand, creating favorable project conditions. Steel slag, cement kiln dust, and coal combustion residues offer enhanced reactivity due to prior thermal processing. Industrial facilities face increasing disposal costs and environmental regulations that motivate on-site valorization. Carbon mineralization of these residues

produces valuable construction materials. The circular economy narrative supports policy and investor interest in waste-to-value carbon removal pathways.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, due to extensive geological formations suitable for in-situ mineralization and significant industrial waste generation from steel and cement production. The United States offers abundant mafic and ultramafic rock deposits in the Pacific Northwest and Appalachian regions. Canada's mining industry generates substantial alkaline residues amenable to carbonation. Research institutions are advancing mineralization technology through Department of Energy funding. Major industrial companies are piloting integrated carbon capture and mineralization systems.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, driven by massive industrial waste generation in China and India and government circular economy policies. The region's cement and steel industries produce enormous volumes of alkaline residues suitable for carbon mineralization. China's carbon neutrality commitment includes research into mineral carbonation as a removal pathway. India's coal power sector generates significant fly ash volumes that could be valorized. Growing construction material demand supports market development for carbonated products.

Key players in the market

Some of the key players in Carbon Mineralization Market include CarbonCure Technologies Inc., Blue Planet Systems Corporation, CarbiCrete Inc., Heirloom Carbon Technologies, 44.01 Ltd., Arca Climate Technologies, Holcim Ltd., Heidelberg Materials AG, CEMEX S.A.B. de C.V., Lafarge Canada Inc., CarbonBuilt Inc., Mineral Carbonation International, MCi Carbon Pty Ltd., Carbon Upcycling Technologies Inc., Solidia Technologies Inc., BHP Group Limited and Rio Tinto Group.

Key Developments:

In June 2026, CarbonCure Technologies Inc. expanded its carbon mineralization concrete technology to over 500 ready-mix plants globally, achieving cumulative CO₂ utilization exceeding 500,000 tonnes in building materials.

In May 2026, Blue Planet Systems Corporation commissioned a commercial-scale synthetic limestone production facility, converting captured CO₂ into carbon-negative aggregate for construction applications.

In April 2026, Holcim Ltd. integrated carbon mineralization technology into a European cement plant, demonstrating the production of carbon-negative concrete using alkaline industrial waste feedstock.

Feedstocks Covered:

Industrial Slag

Fly Ash

Mine Tailings

Natural Silicate Rocks

Cementitious Materials

Other Alkaline Materials

Mineral Types Covered:

Magnesium Silicates

Calcium Silicates

Basalt

Olivine

Serpentine

Industrial Alkaline Residues

Project Scales Covered:

Laboratory Scale

Pilot Scale

Demonstration Scale

Commercial Scale

Technologies Covered:

In-Situ Carbon Mineralization

Ex-Situ Carbon Mineralization

Accelerated Carbonation

Mineral Carbonation Reactors

Industrial Waste Mineralization

Concrete Carbonation

Mine Tailings Carbonation

Applications Covered:

Construction Materials

Carbon Storage

Industrial Waste Utilization

Cement Manufacturing

Aggregates Production

Carbon Credit Projects

End Users Covered:

Cement Manufacturers

Mining Companies

Steel Manufacturers

Chemical Companies

Construction Companies

Government Organizations

Research Institutions

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of 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 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

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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