

Trichlorosilane (TCS) Market By Purity (Medium, High), By Production Process (Hydrochlorination, Direct Chlorination, Hydrogenation) By Application (Polysilicon Production, Silicon Deposition, Solar Photovoltaic (PV) Cells, Chemical intermediate, Others) : Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

Trichlorosilane (TCS) Market

The trichlorosilane (TCS) market was valued at \$5.4 billion in 2023 and is projected to reach \$13.5 billion by 2033, growing at a CAGR of 9.5% from 2024 to 2033.

Trichlorosilane (TCS) is a colorless and volatile inorganic chemical compound which exists in liquid state. The chemical formula of TCS is HCl_3Si . It is a crucial component of the semiconductor industry, where the compound is used to produce high-quality silicon. In addition, silicones used in sealants & adhesives are produced using TCS. Chemical vapor deposition processes make use of TCS for the deposition of thin silicon layers over the substrate. Hence, TCS is a versatile compound with diverse applications in several industries.

The trichlorosilane (TCS) market is growing substantially as there is a global inclination toward renewable energy and increase in demand for solar photovoltaics. Semiconductors play a vital role in solar panels and as the installation of solar panels is rising for different residential & commercial purposes, TCS is observing a surge in demand. Currently, exploration regarding the usage of TCS in nanotechnology and microelectronics is gaining momentum due to the ability of the compound

to deposit thin layers of silicon.

However, the production and handling of TCS requires excessive protection as the chemical is highly hazardous. This has led to the implementation of rigorous regulations, compliance with which is a challenging task for the market players. In the U.S., TCS has been categorized as level 3 (extremely hazardous) in the category of health hazards by the National Fire Protection Association. Furthermore, according to the hazard classification of Korea, TCS stands on level 1 for skin corrosion, level 3 regarding acute inhalation toxicity, and level 4 in case of acute oral toxicity.

Segment Review

The global trichlorosilane (TCS) market is segmented into purity, production process, application, and region. On the basis of purity, the market is bifurcated into medium and high. Depending on production process, it is divided into hydrochlorination, direct chlorination, and hydrogenation. As per application, it is categorized into polysilicon production, silicon deposition, solar photovoltaic (PV) cells, chemical intermediate, and others. Region wise, it is analyzed across North America, Europe, Asia-Pacific, and LAMEA.

Key Findings

On the basis of purity, the medium segment held the highest market share in 2023.

Depending on production process, the hydrochlorination segment accounted for a high share in 2023.

As per application, the solar photovoltaic (PV) cells segment acquired high stakes in 2023.

Region wise, Asia-Pacific was the highest revenue generator in 2023.

Competition Analysis

The major players operating in the global trichlorosilane (TCS) market are Wacker Chemie AG, Tokuyama Corporation, Alfa Chemistry, Gelest Inc., NACALAI TESQUE, INC., Merck KGaA, VWR International, LLC., Tokyo Chemical Industry Co., Ltd., Pharmaffiliates, and Apollo Scientific Ltd. These players have adopted various key development strategies such as business expansion, new product launches, and

partnerships to strengthen their foothold in the market.

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Analysis of raw material in a product (by %)

Investment Opportunities

Product Benchmarking / Product specification and applications

Supply Chain Analysis & Vendor Margins

Upcoming/New Entrant by Regions

Technology Trend Analysis

Market share analysis of players by products/segments

New Product Development/ Product Matrix of Key Players

Regulatory Guidelines

Additional company profiles with specific client's interest

Additional country or region analysis- market size and forecast

Expanded list for Company Profiles

Historic market data

Key player details (including location, contact details, supplier/vendor network etc. in excel format)

List of customers/consumers/raw material suppliers- value chain analysis

Volume Market Size and Forecast

Key Market Segments

By Purity

Medium

High

By Production Process

Hydrochlorination

Direct Chlorination

Hydrogenation

By Application

Polysilicon Production

Silicon Deposition

Solar Photovoltaic (PV) Cells

Chemical intermediate

Others

By Region

North America

U.S.

Canada

Mexico

Europe

France

Germany

Italy

Spain

UK

Rest of Europe

Asia-Pacific

China

Japan

India

South Korea

Australia

Rest of Asia-Pacific

LAMEA

Brazil

South Africa

Saudi Arabia

UAE

Rest of LAMEA

Key Market Players

Wacker Chemie AG

Tokuyama Corporation

Alfa Chemistry

Gelest Inc.

NACALAI TESQUE, INC.

Merck KGaA

VWR International, LLC.

Tokyo Chemical Industry Co., Ltd.

Pharmaceuticals

Apollo Scientific Ltd

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