Titanium Dioxide

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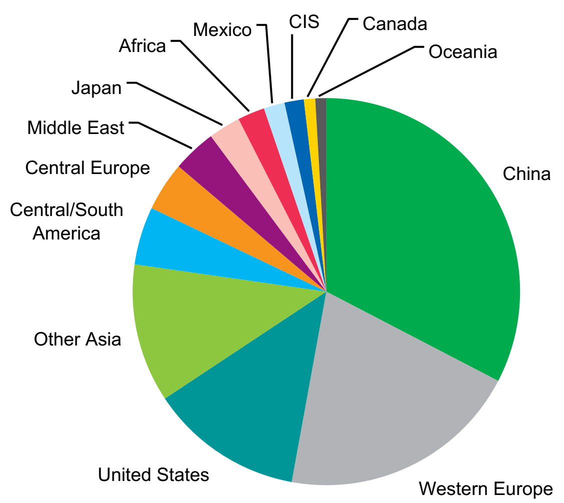
Abstract

Titanium dioxide (TiO_2) is the standard white pigment used principally in paints, paper, and plastics. It is the most important pigment in the world, accounting for approximately 70% of total pigment volume. Titanium dioxide is made by processing a variety of titanium-containing minerals such as ilmenite and rutile. Rutile has a titanium dioxide content of 94–96%, making it highly desirable as a feedstock. Ilmenite is much more plentiful, but has a titanium dioxide content of 50–60%, so it is usually upgraded, or beneficiated, to a higher titanium dioxide content.

Between 2014 and 2015, the paints and pigments industry faced substantial challenges in the Western Hemisphere as Asian, particularly Chinese, producers increased the production levels of cheaper finished product. This resulted in the destocking of inventories, which continued until the middle of 2016. Titanium dioxide is produced by more than 50 companies in China and approximately 20 companies elsewhere. Seven major world titanium dioxide producers account for just over half of the world capacity.

The following pie chart shows world consumption of titanium dioxide:

World consumption of titanium dioxide—2017



Source: IHS Markit

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The major consuming industries for TiO_2 pigments are paints and surface coatings, plastics, and paper and paperboard. Consumption tends to parallel general economic trends for these end-use applications. Ultrafine grades of titanium dioxide (particle sizes between one and 150 nanometers) are used as catalysts, UV blockers, color pigment precursors, and electroceramics. This area is growing, but is still relatively small and will not affect the overall market significantly.

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North American consumption decreased slightly between 2014 and 2015, but picked up again in 2016 and 2017, mainly because of a fluctuation in coatings consumption caused by the swing in the construction and manufacturing markets. Paint and coatings continues to be the largest outlet, accounting for 61% of consumption. Western European and Japanese consumption remains stagnant. The real driver of growth is China, where the coatings and plastics industries continue to expand at high rates. The potential remains high; per capita consumption of TiO_2 in China is about 1.1 kilograms per year, compared with 2.7 kilograms for Western Europe and the United States.

Between 2014 and 2017, China's share of total world titanium dioxide consumption decreased slightly, from 33% to about 32.5%, but is forecast to increase to 34% by 2022. An average annual growth rate of about 3.5% is forecast for Chinese TiO_2 consumption over the next five years.

Poor profitability and lack of growth in Western Europe have prompted further rationalization by sulfate process–based producers, which has led to slightly higher operating rates at a slightly lower capacity level. A capacity reduction in Western Europe of 6.5% between 2014 and 2017 was due primarily to the closure of the titanium dioxide production facility at Huntsman's (Venator's) Calais site in 2015.

The TiO_2 industry expects to have attractive margins for the foreseeable future. The development of new feedstock mines can take five to ten years and new grassroots pigment plants take four to five years to complete, especially when permitting and infrastructure needs must be addressed. With demand forecast to rise by 4–5% annually, the industry needs 200,000–300,000 metric tons of new capacity every year (discounting capacity in China, which generally does not make high-quality pigment).

Contents

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