

TiO₂ Production

Titanium dioxide is a white powder with a high brightness and opacity that is widely used as a pigment in many common consumer applications. The highest-volume use is in paint, where TiO₂ powder is used as the base pigment for most paints in both construction and automotive applications. TiO₂ is also used as filler in plastics, coatings, cosmetics, toothpaste, and sunscreen.

Rain CII supplies high-quality calcined petroleum coke (CPC) which is essential for the manufacture of titanium dioxide via the chloride process.

The chloride process uses CPC as a reducing agent. Titanium containing ore such as rutile and ilmenite is mixed with CPC and fed to a high-temperature fluid-bed reaction vessel known as a chlorinator, which heats the materials to 1000°C. Chlorine gas is added, and the carbon reduces the TiO₂ which then reacts with the chlorine gas to produce TiCl₄ via the reaction below:



Essential for the Manufacture of Titanium Dioxide

The TiCl₄ is recovered and then distilled to generate purified TiCl₄. The TiCl₄ is then re-oxidized to pure TiO₂ using oxygen gas. The chlorine gas generated in the re-oxidation step is recovered and re-used in the process. The fine particle size TiO₂ product typically undergoes milling and small amounts of proprietary, surface-modifying chemicals are added to produce a variety of different product grades for use in a wide range of coating and filler applications.

The quality requirements for the CPC used in TiO₂ applications are not as demanding as those for anode production. Significantly higher vanadium and nickel levels can be tolerated and it is advantageous to use shot coke rather than sponge coke since it is harder and contains a lower percentage of fines (-100 mesh or -150µm). Fines are undesirable in TiO₂ production as they pass straight through the chlorinator and represent a carbon loss. Shot coke typically has a much tighter particle size distribution than sponge coke and it suffers less attrition and generates fewer fines due to handling compared to sponge coke.

Rain CII's CPC supports production of TiO₂ which is used as a pigment in many coating applications and as a filler in other product applications.