



## Titanium dioxide

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Titanium dioxide (titania,  $\text{TiO}_2$ ) is chemically inert, semiconductor that also exhibits photocatalytic activity within the presence of sunshine with an energy adequate to or above its band-gap energy. These characteristics offer a good range of applications. For these reasons, and since of the relatively low price of the staple and its processing, titania has gained widespread attention over recent decades. Titanium, the ninth commonest element within the Earth's crust, may be a metal commonly found in plants and animals. Titanium naturally interacts with oxygen to make titanium oxides, commonly found in ores, indigenous dusts, sands and soils. Titanium oxide, also referred to as titanium (IV) oxide or titania /tai'teiniə/, is that the present oxide of titanium, formula  $\text{TiO}$ .

When used as a pigment, it's called titanium white, Pigment White 6 (PW6), or CI 77891. Generally, it's sourced from ilmenite, rutile, and anatase. Pigment-grade titanium oxide is employed during a range of applications that need high opacity and brightness. In fact, most surfaces and items that are white and pastel, and even dark reminder color, contain titanium oxide. titanium oxide, also called titania, ( $\text{TiO}_2$ ), a white, opaque, present mineral existing during a number of crystalline forms, the foremost important of which are rutile and anatase. These present oxide forms are often mined and function a source for commercial titanium. titanium oxide is odourless and absorbent. Its most vital Function in powder form is as a widely used pigment for lending whiteness and opacity. Titanium oxide ( $\text{TiO}_2$ ) is Therefore increased human and environmental exposure are often expected, which has put  $\text{TiO}_2$  nanoparticles under toxicological scrutiny. Mechanistic toxicological studies

show that  $\text{TiO}_2$  nanoparticles predominantly cause adverse effects via induction of oxidative stress leading to cell damage, genotoxicity, inflammation, immune reaction etc. Taken into account as an inert and safe material and has been utilized in many applications for many years.

However, with the event of nanotechnologies  $\text{TiO}_2$  nanoparticles, with numerous novel and useful properties, are increasingly manufactured and used. Therefore increased human and environmental exposure is often expected, which has put  $\text{TiO}_2$  nanoparticles under toxicological scrutiny.

Mechanistic toxicological studies show that  $\text{TiO}_2$  nanoparticles predominantly cause adverse effects via induction of oxidative stress leading to cell damage, genotoxicity, inflammation, immune reaction etc. The extent and sort of injury strongly depends on physical and chemical characteristics of  $\text{TiO}_2$  nanoparticles, which govern their bioavailability and reactivity. supported the experimental evidence from animal inhalation studies  $\text{TiO}_2$  nanoparticles are classified as "possible carcinogenic to humans" by the International Agency for Research on Cancer and as occupational carcinogen by the National Institute for Occupational Safety and Health.

Titanium (Ti), the ninth most abundant element within the crust, is cosmopolitan. The typical concentration of Ti within the crust is 4400 mg/kg. Due to its great affinity for oxygen and other elements, Ti doesn't exist within the metallic state in nature. The foremost common oxidation number of Ti is +4, but +3 and +2 states also exist. Metallic Ti,  $\text{TiO}_2$ , and  $\text{TiCl}_4$  are the compounds most generally utilized in industry.  $\text{TiO}_2$  (CAS-No. 13463-67-7), also referred to as titanium (IV) oxide, acid anhydride, titania, titanic anhydride, or Ti white, is that the present oxide of Ti.  $\text{TiO}_2$  may be a white noncombustible and odorless powder with a relative molecular mass of 79.9 g/mol, boiling point of 2972°C, freezing point of 1843°C, and density of 4.26 g/cm<sup>3</sup> at 25°C.  $\text{TiO}_2$  may be a poorly soluble particulate that has been widely used as a white pigment.

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