

Titanium Oxide Powder



Titanium Dioxide (TiO₂) is an

inorganic compound widely used in various industries, including cosmetics, paints, coatings, food, and pharmaceuticals. In the cosmetics industry, it is primarily used as a physical sunscreen agent due to its ability to block ultraviolet (UV) radiation.

Chemical Properties of Titanium Dioxide:

- 1. Chemical Structure:**
 - **Chemical Formula:** TiO₂
 - **Molecular Weight:** 79.87 g/mol
 - **Structure:** Titanium dioxide consists of one titanium atom (Ti) bonded to two oxygen atoms (O₂). It exists in different crystalline forms, the most common being rutile and anatase.
- 2. Physical Properties:**
 - **Appearance:** Titanium dioxide is a white, odorless, and non-reactive powder.
 - **Solubility:** Insoluble in water and organic solvents, but can be dispersed in liquids.
 - **Melting Point:** Approximately 1,843°C.
 - **Boiling Point:** Sublimes at approximately 2,972°C.
- 3. UV Absorption and Reflection:**

- **UV Protection:** Titanium dioxide is an effective UV filter, particularly in the UV-B (280-320 nm) and UV-A (320-400 nm) ranges. It works by physically blocking and scattering UV rays, rather than absorbing them like chemical sunscreens.
- **Opacity and Whiteness:** Due to its high refractive index, titanium dioxide provides excellent coverage and opacity, giving products a bright white color. This makes it useful as a pigment in products like paints and cosmetics.

4. **Photostability:**

- Titanium dioxide is highly photostable, meaning it does not degrade when exposed to sunlight. This makes it a reliable ingredient in sunscreens for long-lasting protection.
- However, in its nanoparticle form, there are concerns about potential photocatalytic activity, which could lead to the generation of reactive oxygen species (ROS). This is typically addressed by coating the particles with materials like silica or alumina to reduce reactivity.