

# Potential of Titanium Dioxide and its Application

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**Abstract:** Now a day's metal and metal Oxides including titanium dioxide have been widely studied, due to their importance in recent medical therapies, catalysis, photocatalysis, antibacterial agent and also as nano paints. It is an inorganic compound with attractive physical and chemical characteristics based on the size, crystal phase and shape of particle. Utilization of titanium dioxide is natural amicable because of some electrical, optical and morphological properties.  $\text{TiO}_2$  nanoparticles were concentrated as photosensitizing specialist in the treatment of harmful growth just as in photodynamic inactivation of anti-microbial opposition microscopic organisms.  $\text{TiO}_2$  is also used to mineralized organic compound such as alcohol, carboxylic acid, phenolic derivatives using oxygen as primary oxidant.  $\text{TiO}_2$  has been also used as bleaching, opacifying agent and as U.V protector in cosmetics, paints and enamel.

**Keywords:** Titanium Dioxide

## I. INTRODUCTION

Titanium Dioxide is a naturally occurring substance, chemical formula  $\text{TiO}_2$ , known as titania [1]. It is a common material which has been widely used for many years, Naturally occurring titanium dioxide forms when titanium reacts with the oxygen in the air. Titanium oxide is found in minerals in the earth's crust. It also found with other elements, including calcium and iron. Commercially titanium dioxide was first introduced in 1923, no health concerns and no cases of problems have been detected associated with it. Recently it has been studied that thousands of workers in manufacturing industry or working with titanium dioxide, do not have any health hazards[2]

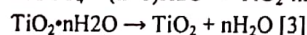
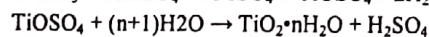
### 1.1 Source

Titanium is mainly sourced from ilmenite ore, which is the most widespread form of titanium dioxide containing ore around the world. Rutile is the next most abundant and contains around 98 percent titanium dioxide in the ore. The metastable anatase and brookite phases convert to the equilibrium phase rutile irreversibly by heating above temperatures in the range of 600 to 800°C (1,112 to 1,472°F).

### 1.2 Process of Formation

There are two main processes for  $\text{TiO}_2$ : Sulphate process and Chloride process but Chloride process is predominant over sulphate process.

#### Sulphate process[3]



### 1.3 Advantages of Sulfate process

The raw material i.e. ilmenite and sulfuric acid used for the above process are low in price and easily available this process requires simple process and it is a well known technology. The equipment used for the sulfate process are simple and made up of anti-corrosion material.

### 1.4 Disadvantages of Sulfate process

1. The process is very short and works on harsh operation, high consumption of sulfuric acid and water, and many wastes and by-products are formed, which are harmful to the environment.