



A REVIEW ON: REDUCTION OF INORGANIC MATTER IN WASTEWATER THROUGH USE OF TITANIUM DIOXIDE

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ABSTRACT

The aim of this research is to carry out the reduction of Inorganic Loading Rate in the wastewater by the use of Titanium Dioxide. Titanium Dioxide in powdered form belonging to nanoscale, gives higher surface area for the adsorption mechanism with the photocatalysis process under the UV lamp. Titanium Dioxide for treating wastewater with higher inorganic loading rate can lead to reduction with higher affectivity.

Keywords: *Titanium Dioxide, Anatase, P₂₅ Degussa, Photocatalytic Adsorption, Inorganic Loading Rate.*

I. INTRODUCTION

The population growth rate is increasing rapidly and at the same time new technology like nanotechnology is coming for future prospects ^[1]. Due to increase in population there is increment in industrialization for future needs and hence increase in inorganic waste may occur due to heavy increment in the industrialization ^[2]. Many times heavy inorganic waste may require separate treatment as its concentration maybe very high. As with time inorganic loading may increase which can cause harm to aquatic life when discharged into water bodies without giving the concerned treatment. So, the new arising technology can play role in dealing with environmental engineering ^[3]. The nanoscale powdered form Titanium Dioxide (TiO₂) can be used for treating the heavy inorganic loading rate containing wastewater. Anatase & P₂₅ Degussa two types of TiO₂ can be used for this purpose under the ultraviolet (UV) radiation ^[4]. Anatase is one of the mineral forms of TiO₂ found in nature and P₂₅ Degussa is the mixture of Anatase and Rutile, where Rutile is also the mineral form of TiO₂ found in nature where the composition of mixture of Anatase & Rutile may vary from 70:30 to 80:20 (Anatase: Rutile) ^[5]. These powders are insoluble in water and hence no further containment occurs of wastewater for its treatment ^[6]. When this nanoscale powdered form TiO₂ taken for the treatment of inorganic loading waste in the wastewater may give effective result in the photocatalytic reaction under UV light source.

II. MATERIALS & METHOD

2.1 Materials

2.1.1 Wastewater sample – The wastewater source from Galvanising industry in Pune



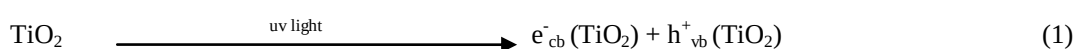
2.1.2 Ultraviolet light source – Additional source of UV light for photocatalysis process with closed casing of wooden box so UV rays do not permeate through and come in direct contact with skin as UV rays are carcinogenic after extent of exposure

2.1.3 Titanium Dioxide – Anatase, P₂₅ Degussa in nanoscale powdered form

2.1.4 Magnetic stirrer – Magnetic stirrer to provide adequate stirring in the solution so that the insoluble powder uniformly gets distributed throughout the solution

2.2 Method

Taking the P₂₅ Degussa/ Anatase in the wastewater and mixing it by magnetic stirrer, thus the solution can be made of TiO₂ and wastewater. By exposing this solution in the UV light, the process undergoes photocatalytic reaction of:



Where, cb is conduction band and vb is valence band [7]. After the process is completed taking the supernatant treated wastewater, as the TiO₂ gets settled at the bottom. The supernatant would be taken for inorganic loading test

III. DISCUSSION

In this research the reduction of inorganic loading rate obtained under the photocatalytic adsorption phenomenon of TiO₂ is studied. The study will be conducted to determine the following:

- To find the optimum timing and optimum dosage for better affectivity
- To comparatively find the effectiveness of both P₂₅ Degussa and Anatase

IV. CONCLUSION

The maximum efficacy can vary for different concentrations with different timing of exposure under UV light. Highest amount of efficiency can be achieved for reduction of inorganic loading rate with the help of Titanium Dioxide.

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