

**Review on the Photocatalytic Degradation of Azo Dyes in  
Presence of TiO<sub>2</sub>**

**A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF**

**MASTER OF SCIENCE**

**IN**

**CHEMISTRY**

**BY**

**SHALIN JOSHI**

**Under the guidance of**

**Dr. Mittal Thakkar**



**DEPARTMENT OF CHEMISTRY**

**PARUL INSTITUTE OF APPLIED SCIENCE**

**LIMDA-391760, VADODARA, GUJARAT, INDIA**

**2019-2020**

## **Abstract**

An overview on the degradation of azo dyes using transition metal doped TiO<sub>2</sub> as photocatalysts in aqueous solutions. Such dopants reduce the recombination of e<sup>-</sup><sub>cb</sub> and h<sup>+</sup><sub>vb</sub> and decrease the band gap or create intra-band gap states, which result in more light absorption. Moreover, the addition of these dopants can alter the surface properties of TiO<sub>2</sub> catalyst such as surface acidity and surface area. Therefore, the photocatalysis on modified TiO<sub>2</sub> can be promoted using visible light. An important role in this process is played by molecular oxygen and other active species such as O<sub>2</sub><sup>•</sup>, HO<sub>2</sub>, H<sub>2</sub>O<sub>2</sub> and •OH which are generated in a sequence of reactions. Besides this, the degradation of dyes depends on several other parameters such as pH, catalyst concentration, substrate concentration and the nature of the doping substances. Depending on the structure of the azo dye, the major identified intermediates are hydroxylated derivatives, aromatic amines, naphthoquinone, phenolic compounds and several organic acids. This review also presents the literature findings on the available pathways and mechanisms of degradation of some azo dyes in the presence of metal doped TiO<sub>2</sub> catalysts.