

**EFFECT OF SOLVENT ON MODIFIED  
PLATINUM DOPED TiO<sub>2</sub> (Pt-TiO<sub>2</sub>) IN DEGRADATION  
REACTIVE RED 4 DYE**

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(Nurfatin Najihah binti Roslan)

## **ABSTRACT**

### **EFFECT OF SOLVENT ON MODIFIED PLATINUM DOPED TiO<sub>2</sub> (Pt-TiO<sub>2</sub>) IN DEGRADATION REACTIVE RED 4 DYE**

In this study, modified Platinum (Pt) doped TiO<sub>2</sub> was prepared via photo-deposition method by using hexa-chloroplatinic acid (H<sub>2</sub>PtCl<sub>6</sub>) as Pt precursor. The prepared sample was divided into several portions prior undergo washing method with various solvents. The solvents used were, dichloromethane (DCM), ethanol, methanol, and acetone. While distilled water was used as a blank washing sample for comparison study. All the washing solvents was chosen based on the normal solvent used for washing process and the solvents boiling point are below 100°C. The photoactivity of all solvents modified Pt doped TiO<sub>2</sub> samples were measured by degradation of RR4 dye under suspension mode, the presence of Pt element was detected for all solvents modified Pt-TiO<sub>2</sub> samples confirmed by FTIR, XRD, and ICP-OES where only small Pt element was observed for all the samples. The increasing of hydroxyl group was detected from Pt doped TiO<sub>2</sub> under DCM washing was this sample able to have an excellent contact with aqueous dye and it proves by enhanced the photocatalytic performance under RR4 dye with the highest photodegradation obtained was dichloromethane with complete degradation of 30ppm RR4 dye achieved within 5 minutes under 55 W fluorescent lamp irradiation.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background of Study**

Industrialization, mining, and urbanization are the human activities that contribute to global environmental pollution. In addition to this issue, the degradation of water quality is dangerously increasing in this era. Controlling the concentration of pollutants in the water resources such as rivers, lakes or oceans is enormously difficult. Water pollution and its adverse impact on the aquatic ecosystem and human health are found all over the world (Varma et al., 2020). Polycyclic aromatic hydrocarbons, heavy metals, dyes, and pesticides are a few examples of chemical pollution.

Organic pollutants such as organic coloring dyes used in textile industries are getting increase and become a vital issue due to the toxicity and stable molecular structure which result in difficult for them to degrade. Residual water that containing colouring dyes will increase the level of oxygen demand for both chemical (COD) and biochemical (BOD) (Malik & Nath, 2021). On the other hand, with the technology advancement, utilization of an efficient wastewater treatment is needed with a new technology