

**EFFECT OF PLATINUM DOPED TiO₂ FOR
PHOTOELECTROCHEMICAL DEGRADATION OF VARIOUS DYES**

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ABSTRACT

EFFECT OF PLATINUM DOPED TiO₂ FOR PHOTOELECTROCHEMICAL DEGRADATION OF VARIOUS DYES

In this study, unmodified and Pt doped TiO₂ were used as photocatalysts in photoelectrochemical (PEC) and electrochemical (EC) processes. Various dyes ie; rhodamine B, methylene blue, methyl orange and crystal violet were used in this study as model degradation pollutants to determine the effect of Pt on TiO₂. From the result, Pt-TiO₂ has shown better photocatalytic performance as compared with TiO₂ for all dyes. Crystal violet (CV) dye has shown the highest degradation after 30 minutes under PEC process by using Pt-TiO₂ sample which was 99.5% removal compared with rhodamine B, methylene blue and methyl orange which ca. 95.2, 98 and 91.8% respectively. CV had also shown the highest k-value under same condition which was ca. 0.212 min⁻¹, where k-value of 0.088, 0.114 and 0.072 min⁻¹ were observed under rhodamine B, methylene blue and methyl orange respectively. PEC process was also proven to be more efficient than EC as light irradiation in PEC process plays a vital role in degradation of dyes. Pt peaks were observed in EDX which indicates the present of Pt element in Pt-TiO₂. It was further confirmed by XRD analysis where it shows the peaks representing Pt element at 38.37, 44.03, 64.98 and 78.14°. From the calculation of XRD spectrum, crystalline size of Pt-TiO₂ has decreased compared to unmodified TiO₂. It indicates that the presence of Pt onto TiO₂ plays an important role in enhancing PEC degradation process by decreasing the crystalline size of Pt-TiO₂.

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