

## Comparison of lignin degradation by photocatalyzed $\text{TiO}_2$ and ZnO with electron scavengers

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Lignin is one of the most problematic pollutants in paper wastewater because it is a major chemical oxygen demand (COD) component and is responsible for color and turbidity of the paper wastewater. Also it is very hard to degrade for conventional water treatment methods due to many rigid aromatic units on its structure. In my experiments, photocatalytic oxidation method was applied for lignin degradation. To compare photocatalytic mechanism of lignin,  $\text{TiO}_2$  and ZnO were used. Two photocatalysts showed different lignin degradation rate under UV irradiation (365 nm BLB lamp). Lignin degradation rate with ZnO was retarded at first time but accelerated after 90 minutes. On the other hand,  $\text{TiO}_2$  showed linear degradation phenomenon with time. These phenomena were explained by the difference of favorable photocatalytic pathway (ZnO: indirect,  $\text{TiO}_2$ : direct). And in presence of  $\text{Fe}(\text{ClO}_4)_3$  (additional electron scavenger), degradation efficiency was increased with ZnO but with  $\text{TiO}_2$ , decreased degradation efficiency was observed. These phenomena were explained by  $\text{H}_2\text{O}_2$  (natural electron scavenger) consumption of  $\text{Fe}^{3+}$ .