



## Preparation of commercial $\text{TiO}_2$ coated on activated carbon for decolorization of methylene blue

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This work, decolorization of methyleneblue (MB) by commercial grade of titanium dioxide ( $\text{TiO}_2$ ) coated on activated carbon (AC) was investigated. The first step, photocatalytic activity of  $\text{TiO}_2$  powder from the three types of commercial grades that were  $\text{TiO}_2$  DHA100 ( $\text{TiO}_2$ -DHA),  $\text{TiO}_2$  Hitox STD ( $\text{TiO}_2$ -STD) and  $\text{TiO}_2$  Hitox GARY ( $\text{TiO}_2$ -GARY) were observed under MB concentration of 30 mg/L. The result showed that  $\text{TiO}_2$ -DHA and  $\text{TiO}_2$ -STD had efficiencies for decolorization of 93.97 and 93.94%; respectively. Second step, investigation of solubility of  $\text{TiO}_2$ -DHA and  $\text{TiO}_2$ -STD powder, they were dissolved in sulfuric acid ( $\text{H}_2\text{SO}_4$ ) and ammonium hydroxide ( $\text{NH}_4\text{OH}$ ) of 0.1, 0.2 and 0.3 M. The result showed that  $\text{TiO}_2$ -DHA powder was the best solute. It can dissolve of 6.50 mg per 100 ml for sulfuric acid of 0.2 M. Finally, photocatalytic activity of AC that coated  $\text{TiO}_2$ -DHA solution of 1, 3, 5 and 10 cycles were observed with the condition of  $\text{TiO}_2$ -DHA of 6.50 mg per 100 ml for sulfuric acid of 0.2 M. Under UVA irradiation time of 60 min and concentration of 30 mg/L, decolorization efficiencies were 91.31, 99.68, 100, and 53.93% for AC coated  $\text{TiO}_2$ -DHA of 1, 3, 5 and 10 cycles; respectively. This result showed that AC with coated by  $\text{TiO}_2$ -DHA of 3 cycles was the optimum condition.

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