

## **Comparison between the photocatalytic degradation of single and binary azo dyes in TiO<sub>2</sub> suspensions under solar light irradiation**

### **Abstract**

Textile industries discharge a large quantity of colored wastewater which is harmful to the ecosystem. In this study, two kinds of dyes were investigated: the mono azo Acid Orange 7 (AO7) and diazo Reactive Green 19 (RG19). The photocatalytic degradation of single (AO7, RG19) azo dye and binary (AO7 and RG19 mixture) azo dye aqueous solutions was photocatalyzed by commercial titanium dioxide (TiO<sub>2</sub>, P25) under solar light irradiation. The objectives of this study are to compare the photocatalytic degradation between single and binary azo dye aqueous solution and to study the various parameters such as the effect of different initial azo dye concentrations, different initial azo dye pH values, and compare the adsorption capacity of azo dyes with and without solar light irradiation, which influences the photocatalytic activities of single and binary azo dye aqueous solutions in a TiO<sub>2</sub> suspension. The results showed that photocatalytic degradation of AO7 and RG19 in a single azo dye aqueous solution was faster than a binary azo dye solution under the solar light irradiation process. Chemical oxygen demand results revealed that complete mineralization could be achieved for both AO7 and RG19 azo dyes under solar light irradiation within 22 hours.

### **Keywords**

Adsorption capacity; Azo dyes; Mineralization; Photocatalytic degradation; Solar light; Titanium dioxide