

Solar photocatalytic degradation of mono azo methyl orange and diazo reactive green 19 in single and binary dyesolutions: Adsorbability vs photodegradation rate

Abstract

The objective of this study was to examine the effects of adsorbability and number of sulfonate group on solar photocatalytic degradation of mono azo methyl orange (MO) and diazo Reactive Green 19 (RG19) in single and binary dye solutions. The adsorption capacity of MO and RG19 onto the TiO_2 was 16.9 and 26.8 mg/g, respectively, in single dye solution, and reduced to 5.0 and 23.1 mg/g, respectively, in the binary dye solution. The data obtained for photocatalytic degradation of MO and RG19 in single and binary dye solution were well fitted with the Langmuir-Hinshelwood kinetic model. The pseudo-first-order rate constants of diazo RG19 were significant higher than the mono azo MO either in single or binary dye solutions. The higher number of sulfonate group in RG19 contributed to better adsorption capacity onto the surface of TiO_2 than MO indicating greater photocatalytic degradation rate.