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Heat activated persulfate oxidation of Reactive Black 5

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ABSTRACT

Sulfate radical based advanced oxidation processes gained great attention for the removal of refractory organic pollutants from wastewaters. In this study, heat and solar activated persulfate were tested for the removal of Reactive Black 5 from water matrices. Experiments were carried out under 1/30, 1/50, 1/100, 1/500 and 1/1,000 dye/potassium persulfate ratio at room temperature, 40°C and 60°C. Experiments that were conducted at 1/500 and 1/1,000 molar ratios and 60°C resulted in ≥99% color removal after reasonable reaction time (5–10 min). 99% of mineralization was observed after 90 min of treatment. Outdoor oxidation runs were conducted in July at the main campus of the European University of Lefke and resulted in complete de-colorization after 30 min at 1/1,000 molar ratio while 70% de-colorization observed when molar ratio was adjusted to 1/100. An increase of temperature from 25°C to 40°C was observed during the 90 min of reaction time without any additional heating.

Keywords: Sulfate radicals; Reactive Black 5 removal; Heat-activated persulfate; Advanced oxidation processes

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