



Influence of operational parameters on photodegradation of Acid Black 1 with ZnO

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ABSTRACT

The photodegradation of Acid Black 1 (AB 1) using ZnO as photocatalyst in aqueous solution has been investigated under different conditions. The degradation is higher with UV/ZnO process than with UV/TiO₂-P25 process at neutral pH 7. The influence of operational parameters such as the amount of photocatalyst, dye concentration and initial pH on degradation by ZnO has been analyzed. At pH 7, maximum degradation efficiency is observed and the leaching of Zn²⁺ due to photocorrosion is also significantly reduced when compared to pH 3 and 5. The addition of oxone increases the dye removal where as KIO₄, KIO₃ and H₂O₂ fails. The degradation of AB 1 follows pseudo-first-order kinetics according to the Langmuir-Hinshelwood model. GC-MS analysis reveals the formation of azobenzene, 3-aminobenzene-1,2-diol, 2-aminobenzene-1,4-diol and 5-aminobenzene-1,3-diol as intermediates. The degradation of AB 1 has also been confirmed by COD measurements.

Keywords: Acid Black 1; Degradation; Photocatalysis; Oxidants; Metal ions

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