



PURIFICATION OF DYEING WASTEWATER BY USING ELECTRICAL DISCHARGE PLASMA

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Abstract

Electrical discharge methods such as pulsed corona discharge and dielectric barrier discharge (DBD) for the treatment of textile-dyeing wastewater were investigated. Firstly, the degradation of azo dyes including Acid Red 27 and Reactive Blue 4 was conducted using pulsed corona discharge to the surface of wastewater, and the role of the electrical discharge in the degradation was considered. The results indicated that the pulsed corona discharge method was able to effectively degrade the dye molecules. The main degradation pathway was found to be the reaction of the dye with ozone produced by the electrical discharge, which implies that the degradation can be further enhanced by improving the contact between gas and liquid phases. Secondly, so as to make the most of ozone to the degradation, the electrical discharge was indirectly applied to the treatment of the wastewater, i.e., ozone produced by the DBD was injected to the wastewater through a diffuser. This indirect method capable of increasing the gas-liquid interfacial area was very favourable to speed and enhance the degradation. The chromaticity removal efficiency for the two dyes was higher than 98%, and the chemical oxygen demand (COD) removal efficiency was about 80%.

Keywords: electrical discharge, textile-dyeing wastewater, chromaticity, chemical oxygen demand
