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Decoloration of Methyl Red by gliding arc discharge

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ABSTRACT

The degradation of an azo dye, the Methyl Red, has been studied by gliding arc discharge. The main advantage of this process is due to the large production of reactive species, specially the hydroxyl radicals ($OH^{\cdot}$). These radicals are able to oxidize organic pollutants and treat dye wastewater. The coupling of this process with Fenton reagent (Fe^{2+}), with Titanium oxide (TiO_2) and with TiO_2 and Fe^{2+} simultaneously was investigated in order to enhance the decoloration rate. The results show that the decoloration of Methyl Red was more efficient in the presence of Titanium oxide than Fe^{2+}. Moreover, the presence of TiO_2 has the same effect as Fe^{2+} and TiO_2 simultaneously. Under optimal condition, the degradation of Methyl Red was around 97.8%. This implies that the majority molecules of Methyl Red are destroyed. In other hand, the hydroxylation reaction of Methyl Red can be treated as a kinetic pseudo-first order.

Keywords: Humid air plasma; Gliding arc; Methyl Red; Decoloration

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