

Catalytic wet oxidation of dyehouse effluents with Cu/Al₂O₃ catalyst at atmospheric pressure

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Catalytic wet oxidation using Cu/Al₂O₃ catalyst and H₂O₂ was employed for the treatment of dyehouse effluents. The method was found to be efficient for the removal of both TOC and color at atmospheric pressure. The oxidation was based on hydroxyl radical(HO•) produced from the dissociation of H₂O₂. The removal efficiency was strongly related to the consumption of hydroxyl radical. The oxidation rate was affected by amount of H₂O₂ and when small amount of H₂O₂ was used, the removal of color did proceed but the TOC concentration remained unchanged. This result indicated that there were two steps involved in the oxidation. At first occurred the breakdown of the large dye molecules into smaller molecules of organics which were then degraded consecutively into carbon dioxide and water. The surface of copper particles in Cu/Al₂O₃ catalyst provided sites not only for the activation of H₂O₂ dissociation to give hydroxyl radicals, but also for the adsorption of the organic dye molecules.