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COAGULATION COMBINED WITH FENTON PROCESS FOR THE TREATMENT OF WATER-BASED PRINTING INK WASTEWATER

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Abstract

Water-based printing ink has been used widely and perfectly in printing the packaging of food, drug, and wine products etc. However, due to the need of altering different colors of ink, most water-based printing ink wastewater was generated from the equipment cleaning process. Coagulation combined with Fenton process has been used for this kind of wastewater treatment in this study, results showed that coagulation using polyaluminium chloride (PACl) as coagulant and ferrous sulfate (FeSO_4) as coagulant aid was an efficient pretreatment process, around 96.5% of color and 91.1% of chemical oxygen demand (COD) was removed at the condition of 750 mg L^{-1} PACl, 500 mg L^{-1} FeSO_4 and without pH adjustment, suggesting that the coagulation-treated effluent could be recycled and reused for cleaning the production and printing equipments. Some residual COD and all color were removed from coagulation-treated effluent by Fenton process under the following conditions: pH 3, 300 mg L^{-1} H_2O_2 , 220 mg L^{-1} FeSO_4 and 90 min of oxidation. In general, the overall removal of color and COD could reach 100% and 94.5%, respectively. This integrated process is a promising approach for treating wastewater from water-based ink manufacturers and printing plants to meet the stringent discharge requirements.

Key words: coagulation, Fenton reagents, polyaluminium chloride, water-based printing ink

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