

Simultaneous wastewater decoloration and fly ash dechlorination during the dye wastewater treatment by municipal solid waste incineration fly ash

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ABSTRACT

In this paper, the simultaneous decolorization of dye wastewater and dechlorination of municipal solid waste incineration (MSWI) fly ash were evaluated by using MSWI fly ash as adsorbent for synthetic dye wastewater (methylene blue, MB) and real dye wastewater treatment. After mixing with dye wastewater, the chlorine content in MSWI fly ash can be reduced effectively from 10.95% \pm 0.53% to 0.44% \pm 0.06% (below the standard (1%) of cement substitution material in China), and the residual heavy metals in fly ash obtained from toxicity characteristic leaching procedure (TCLP) can meet the US EPA leaching standards. Simultaneously, the color and total organic carbon (TOC) in wastewater can be significantly removed due to the adsorption of dye on MSWI fly ash. MB adsorption on MSWI fly ash followed Langmuir model and the monolayer adsorption capacity of MB was estimated to be 10.20 mg/g. The results indicate that using MSWI fly ash to treat dye wastewater is a promising method which can put into effect the dechlorination of MSWI fly ash and the decolorization of dye wastewater at the same time.

Keywords: MSWI fly ash; Dye wastewater; Methylene blue; Color removal; Wet dechlorination

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