

A NOVEL RESOURCE UTILIZATION METHOD OF THE FLUE GAS DESULFURIZATION RESIDUE FOR REMOVING Cr(VI) FROM ELECTROPLATING WASTEWATER

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In this research, a novel resource utilization of the residue from magnesium-based wet and calcium-based semi-dry flue gas desulfurization (FGD) were investigated. The main composition of magnesium-based wet FGD residue was $MgSO_3 \cdot 3H_2O$, and the main composition of calcium-based semi-dry FGD residue was $CaSO_3 \cdot 0.5H_2O$. Electroplating wastewater is a common chromium-containing wastewater, the main pollutants in the wastewater are hexavalent chromium ($\rho Cr(VI)=45$ mg/L) and total chromium ($\rho TCr=51$ mg/L). In this progress, the FGD residue could be used as a low-cost reductant to reduce Cr(VI) to Cr(III), which are less toxic and easy to separate. When the magnesium-based wet FGD residue was used as the reductant, the optimum conditions are as follows: in the stage of Cr(VI) reduction, the optimum pH=2.5, residue dosage is 0.55 g/L, reaction time 15.0 min; in the stage of TCr precipitation, the optimum pH=7.5, the reaction time is 15.0 min. Under the optimal conditions, the residual concentrations of hexavalent chromium and total chromium are 0.035 mg/L and 0.08 mg/L, respectively. When the calcium-based semi-dry FGD residue was used as the reductant, the optimum conditions are as follows: in the stage of Cr(VI) reduction, the optimum pH=2.5, byproduct dosage is 0.65 g/L, reaction time 15.0 min; in the stage of TCr precipitation, the optimum pH=7.5, the reaction time is 15.0 min. Under the optimal conditions, the residual concentrations of hexavalent chromium and total chromium are 0.021 mg/L and 0.08 mg/L, respectively. According to the government standard (GB21900-2008), the residual concentration of heavy metal pollutants were already well below the emission limits.

Biography

Dean Fang was the Doctoral student from Department of Resource and Environment of Northeastern University. He worked on the sewage and waste treatment field, and he has published three academic in reputed journals.

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