Research on PFS Coagulating Treating the Ceramic Wastewater

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Abstract—PFS coagulation sedimentation method of high concentration ceramic wastewater .As turbidity, absorbance removal, conductivity haracterization to determine the PFS reagents. Comparison of different reaction conditions, the turbidity removal, color removal, conductivity, optimal operating conditions to determine the dosage of PFS. Experiment, the ceramic waste water 300 mL, stirring time for 5 mins, settling time is 30 mins, first set the PFS amount of 500-2000 mg / L, then the more the amount of PFS, the worse the treatment effect; then set the amount of PFS 40-280 mg / L, the amount of PFS in the 100-130 mg / L, treatment is better; the last set PFS amount of 100-130 mg / L, PFS determines the most appropriate dosage,and the results show that, PFS appropriate dosage of 105 mg / L, turbidity removal rate of 93.8%, 98.0% removal rate of absorbance, electrical conductivity of 92.7%.

Key words: ceramic water; PFS coagulant; coagulation; turbidity; absorbance; conductivity.

In the ceramic production process, usually a lot of hard natural sedimentation of suspended solids were produced .These pollutants mainly from raw materials by the formation of the particle size after milling <2 μm solid particles and floating dust after landing in the mud washed into the drain water and wastage of clay. Because different levels of corporate management, waste water was discharged by the plant the concentration of suspended particles of different sizes (1 000 ~ 10 000 c / L), most small and medium enterprises discharged wastewater ceramic volume of 500 ~ 1 000 t / d. Waste water of clay is processed by multiple processes basic raw materials, high values, it is not only unfortunate but also the loss and abandonment caused serious pollution to the environment [1]. Therefore, the need for comprehensive treatment, in order to achieve not only reduce environmental pollution, and the comprehensive utilization of waste water and clay are the purpose[2].

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1.Experimental section

1.1Research object

Ceramic wastewater from a ceramics factory of Chaozhou ,Its performance like table 1.

Maximum absorption wavelength(mm)	Absorbency	Turbidity	Conductivity	Suspended
474	2.445	4870	250	0.184

Table 1 Various Parameters of the Original Samples From Ceramic wastewater

1.2 Experimental reagent and instrument

Experimental reagent： PFS 、Potessium dichromate potassium、Ammonium ferrous sulfate、Sulfuric acid、Sulfuric acid mercury、Sulfuric acid silver、Sodium hydroxide，Above all for analysis of reagent pure.

Experiment instrument：like table 2 。

Device name	Model	Manufacturer
Constant temperature magnetic blender	85-2	Guohua electric appliance Co., LTD
Precision acidity plan	PHS-2C	Shanghai precision &scientific instrument

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		Co., LTD
Electronic balance	FA2004N	Shanghai precision &scientific instrument Co., LTD
Scattering type turbidity meter	QZ201	Suzhou green Ann instrument Co., LTD
Spectro photometer	752	Shanghai precision &scientific instrument Co., LTD

Table2 List of Experimental Apparatus

1.3Experimental Methods

（1）The preliminary research of PFS′dosing dose

Making the ceramic wastewater which is in store liquid barrels fully agitate，take 300 mL of unprocessed ceramic wastewater to the beaker whose capacity is 500 mL, after being mixed properly, Add suitable amount of PFS,use the magnetic stirring apparatus rubbing the miscible liquids for 5 mins, and then,put it into there graduated cylinders averagely whose capacity is 100 mL, freefalling 30 mins，use the glue head dropper absorbing supernatant liquor to the supernatant liquor, lastly,determine their turbidity, absorbance, conductivity and so on . Study the treatment effect of PFS[3].

（2）PFS'decrement, The research of Optimal dosing dose

By means of the preliminary research of PFS′dosing dose, the optimal dosing dose ranges of PFS was obtained. Gradually increase the dose in this scope ,doing experiments according to PFS dosing doses of preliminary research process , make sure the optimal dosing dose lastly.

（3） dilute the water sample to 0.2≤A≤0.7 as optimal rangea to determineing its absorbency A ,use the maximum absorption wavelength 474nm of ceramic wastewater as the precondition, calculate under the the decolorization rate formula$\eta=(A_0-A)/A_0\times100\%$, η is the decolorization rate, A_0 is used as the original samples absorbency and A is absorbance of treated water[4] .

（4）PFS use ferrous sulfate ,ferric sulfate or pickling liquid of steel as ingredients, produced by using Such steps oxidation of hydrolysis polymerization [5].

2.Results and discussion

2.1 The influence of PFS high dosing doses

Experimental conditions：

Sample dosage:300 mL； Stirring time:5 mins；Settling time:30 mins。

PFS dosing quantity:500 mg/L，750 mg/L，1000 mg/L，1250 mg/L，1500 mg/L，1750 mg/L，2000 mg/L

Experimental results as shown in figure 1, 2, 3 below.

Fig. 1.PFS high dosing quantity figure

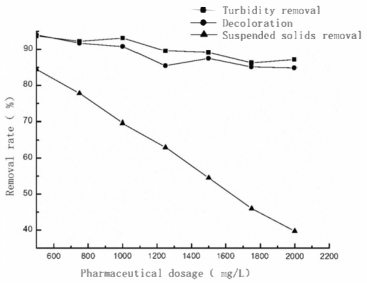

Fig. 2 Influence of PFS on the turbidity removal rate, the colour removal rate and the suspended matter removal rate.

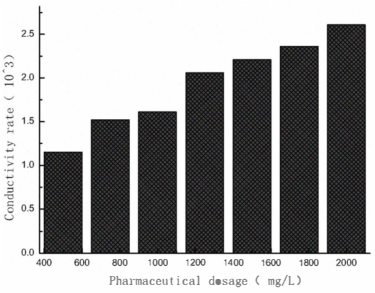

Fig. 3 Influence of PFS on the electroconductibility removal rate

2.2 The influence of PFS malign dosing doses

Experimental conditions：

Sample dosage: 300 mL； Stirring time:5 mins； Settling time:30 mins。

PFS dosing quantity:40 mg/L，70 mg/L，100 mg/L，130 mg/L，160 mg/L，190 mg/L，220 mg/L，250 mg/L，280 mg/L

Experimental results as shown in figure 4,5,6 below.

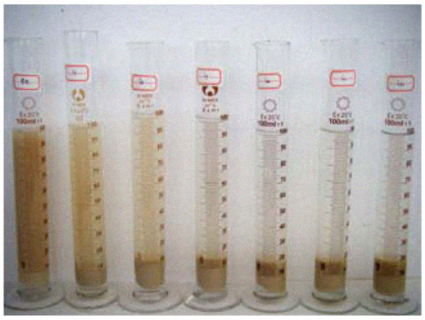

Fig. 4.PFS malign dosing quantity figure

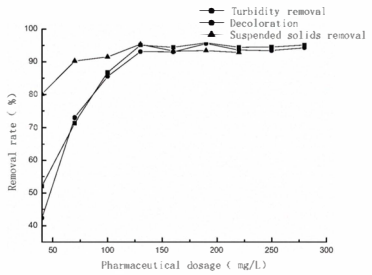

Fig. 5 Influence of PFS on the turbidity removal rate, the colour removal rate and the suspended matter removal rate.

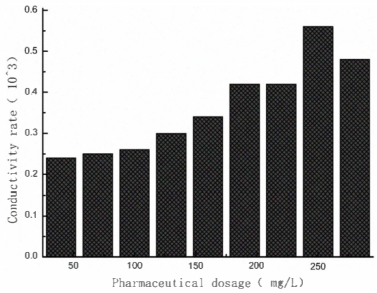

Fig. 6 Influence of PFS on the electroconductibility removal rate

As can be seen from the above chart：

(1)Considering the economic and practical，when mixing time is 5min and settling time is 30min the dosage of agglomerants PFS for 100 to 130 processing the best effect, Turbidity removal can reach the highest 95.05%, Decolorization rate can reach highest 93.09%, Aerosols can reach 95.33% highest removal, Therefore, in the amount of the PFS between the refinement of 100 to 130 experiments to determine the optimum dosage.

(2) The main function of stirring and the solution is to mix the pharmacy, the pharmacy and particulate organic matter so that there are good opportunities for contact, so that full coagulation of pharmacy, in the settlement stage to maximize the settlement, which meet the ultimate goal of experimental study.

2.3 The influence of PFS dosing quantity refining

Experimental conditions：

Sample dosage: 300 mL； Stirring time:5 mins； Settling time:30 mins。

PFS dosing quantity: 100 mg/L， 105 mg/L，110 mg/L，115 mg/L，120 mg/L，125 mg/L，130 mg/L

Experimental results as shown in figure 7,8,9 below.

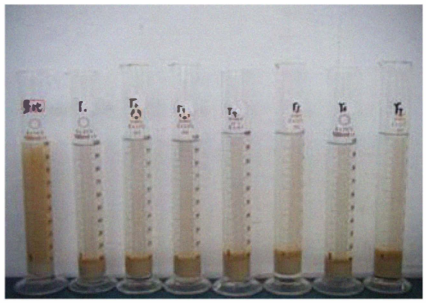

Fig.7.PFS dosing quantity refining

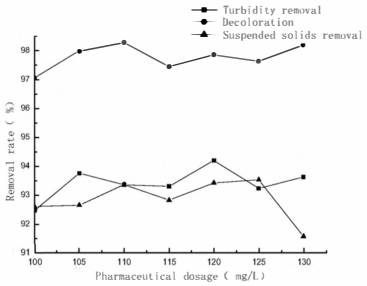

Fig. 8 Influence of PFS on the turbidity removal rate, the colour removal rate and the suspended matter removal rate.

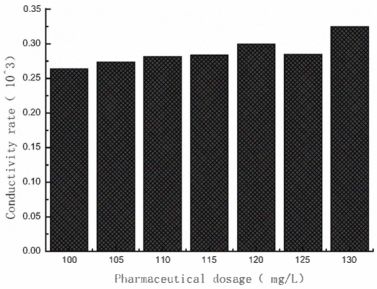

Fig. 9 Influence of PFS on the electroconductibility removal rate

As can be seen from the above chart:

PFS coagulant dosage of 100 to 130 in the treatment effect between the difference is not particularly large, in the dosage of 120 mg / L and the dosage of 105 mg / L, their treatment effect is very close, though usage is 120 mg / L, the removal rate of each target bigger, but considering the economic benefits, and ultimately determine the coagulant dosage of 105 mg / L when the treatment was best.

3.Conclusion

（1）The PFS coagulant treatment of wastewater, the precipitation of sludge is easy self-degradation, can be used as fertilizer, no secondary pollution.As a green water treatment agent, it has a good prospect.

（2）0The best conditions of the ceramic waste water treatment: PFS coagulant dosage of 105 mg / L, stirring time 5 mins, settling time 30 mins, the removal rate of turbidity is 93.8%, the removal rate of absorbance is 98.0%, conductivity is 92.7%.

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Thanks

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