A New Kind of Strong Acidic Tin Plating Baths Recovery Processing Graft

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Abstract: By regulating the temperature of the aqua, joining sodium sulfate to compress the electricity layer, carrying on the flocculating with the APAM (aq), the colloid granule sinking at the bottom can be gathered. Finally, by pressing, products of tin filter cake can be got.

Key words: tin plating baths; acidic; sodium sulfate; APAM
CLC number: X703.1 Document code: A Article ID: 0529-6579 (2007) Sl-0111-03

1 Preamble

Currently, the recovery of tin plating baths has very high economic benefit and social benefit, but the widespread processing craft have varipus problems. For example, the cost is too high, the cycle is too long, and the tin content of tin filter cake is too low, and so on. So it is necessary to develop a new and more effective kind of craft. This craft doesn't need to regulate the pH of the aqua, will not produce a great deal of miscellaneous deposit. Also don't need to use thick sulfuric acid, so the filtrate can be let by simple processing then. This processing craft has the characteristics of efficientcy, quickness, low cost. It can carry on volume-produce continuously, so be suitable to the factory with small space and simple equipments. And to the corporation carrying on specialized recovery to the waste water, it also has instructional meaning.

2 Craft flow

The whole craft process shows as in figure 1. This craft process is very simple, mainly including preheating waste water to 80—90℃, using sodium sulfate and APAM to gather the colloid granule to sink, then carry on pressing to separate and get product tin filter cake. The dosage of APAM is the key of the control cost and the tin recovery rate.

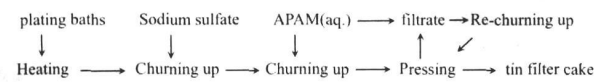

Fig. 1 The craft flow

3 Craft condition

3.1 The efficiency of Sodium sulfate and the APAM

Because the acidity of the tin plating baths is very strong (pH< 0.5), tin dissolve in the water as the (α-H_2SnO_4), which can exists stably till months later. Therefore breaking the stable system of the colloid, making the tin gather to sink is the main task of this craft.

Tab. 1 Results

	sodium sulfate/g	0.4% APAM (aq)/mL	Tin in cake /%	efficiency /%
①	1.6	150	17.2	95.4
②	3	100	17.3	94.8
③	4	90	16.5	90.3
④	5	83	16.8	90.7
⑤	6	80	17.1	91.6

In the environment of the acidity, colloid take positive charge, according to the DLVO theories, the ion with opposite charge can compress the surface electricity layer of the colloid, causing the (α-H_2SnO_4) to gather to sink as granule[1-2]. And APAM catches the colloid granule through the bridging and net structure, adsorbing the colloid granule, then becoming big flocculation to sink[3-4]. At first adding salt to break the stable system of the colloid liquor, weaken the repulsion and reduce the distance of the colloid granule. It is good to make use of bridging and net structure with

①收稿日期: 2007-01-10
基金项目: "实现工业废弃物无害化"资助项目 (B2041360)
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APAM. And the ion takes more opposite charges, the ability of salt compressing the surface electricity layer is more strong. The result shows as in table 1. (Tin plating baths ingredient: V= 50 mL, pH< 0.5, Tin 47.5 g/L, t=28℃)

It is clear that in the normal temperature, the processing cost and the recovery efficiency are decided by the dosage of the APAM. And the sodium sulfate can compress the double electricity layer of the colloid with the right concentration, make the distance of the colloid granule reduce. It is advantageous for the colloid granule to gather to sink. But excessive sodium sulfate will react to make the colloid granule re-scatter in water. In the above condition the dosage of the APAM is too much, lead the cost too much. And increasing sodium sulfate can't replace reducing the dosage of APAM. Therefore have to change other conditions to break the stability of the colloid, to lower the cost of the craft.

3.2 The efficiency of temperature

When the temperature goes up, the stability of colloid decreases quickly, the granule gathers and sinks quickly. So heat the tin plating baths to raise the temperature, add the sodium sulfate to compress electricity layer and use the APAM to carry on gathering colloid to sink finally. The project and its result are as follows: (Tin plating baths ingredient: V= 50 mL, pH< 0.5, Tin 47.5 g/L, t=28℃); (The sodium sulfate 600 yuan/ton, The APAM (M 13 000 000): 15 000 yuan/ton). Table 2 and Table 3 as follows:

	T /℃	Sodium Sulfate/g	0.4% APAM/mL	Tin in Cake/%	Efficiency /%
⑥	70	4.0	40	15.5	87.5
⑦	80	4.0	25	16.5	88.9
⑧	85	4.0	17	17.0	89.3
⑨	90	4.0	20	17.7	88.0
⑩	85	2.0	25	20.8	92.0

	Sodium sulfate/m³		APAM/m³		Total cost (yuan/m³)
	Dosage /kg	Cost /yuan	Dosage /kg	Cost /yuan	
⑥	80	48	3.2	48	96
⑦	80	48	2	30	78
⑧	80	48	1.36	20.4	68.4
⑨	80	48	1.6	24	72
⑩	40	24	1	30	54

It is known from crafts above, temperature at 80℃ above, the stability of colloid system is broken effectively. Though at the condition that the sodium sulfate and the APAM dosage reduces consumedly, the effect of colloid granule be gathered to sink is very good. Because the flocculation of the tin colloid is big, the flocculation can be separated with simple pressing. After first pressing, adding APAM into filtrate to re-flocculate. And the total efficiency can reach 99%. It shows the general result of craft⑩ is the best. So craft ⑩ can be chosen as the feat processing craft.

3.3 The choice of the milling speed

It should be quickly while joining sodium sulfate and 90% of the APAM, but must be slowly while in the final stage. Because the primal milling stage takes great speed in order to mix well. At last a little APAM can flocculate into big settling with slow milling.

4 Summing-up

① It can carry on mixing directly after joined sodium sulfate into the colloid that have been heated, don't need to carry on a heat preservation processing, because the heating has already broken the stability of the colloid timelessly.

② It can't join sodium sulfate first before heating waste water. Because sodium sulfate will make the colloid granule sink, go against the conduction of the calories, make the part of the piping or the container too heat into explode.

③ The concentration of the APAM should below 0.4%, too high to unfold bridge chain, make the effect of flocculating die down.

④ After the most of colloid granule flocculated, if continue to join a great deal of APAM that only can gather small granule to big, but can't raise the rate of reclaiming effectively. But after the first passing, carrying on the second flocculating to the filtrate with the APAM, then can raise the rate of reclaiming to 99%. And the dosage of the APAM can have been reduced largely.

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生态弹性填料及陶粒在微污染水体处理中的应用研究

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摘　要：生态弹性填料是一种模拟天然水草形态加工而成的新型水处理材料，近年来在污水处理中得到了广泛应用。其具有比表面积大、去除有机物容积负荷高、生物附着性好、空隙可变、不易堵塞、适应性强、操作管理简便等优点；陶粒具有较高的孔隙率及适中的密度，所有这些都有利于微生物的生长。本文采用人工湿地作为构筑物对崇明前卫生态村中心湖的水体进行处理，结果表明，经此工艺处理后的水体，COD_{Cr}、TP、TN、氨氮等指标达到或优于国家三类水质标准。并为工程实施提供了科学依据。

关键词：生态弹性填料；陶粒；微污染水体；天然水草
中图分类号：X703

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一种高效的强酸性镀锡废液回收处理新工艺

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摘　要：阐述了一种未见报道的能对强酸性镀锡废液进行大规模集中回收处理的新工艺。这套工艺是在对废水进行预热的条件下，利用硫酸钠和聚丙烯酰胺作为聚沉剂和絮凝剂，便可在短时间内对大量的强酸性废液进行高效处理，最后经过压滤便可得含锡量高的锡泥。

关键词：镀锡废液；硫酸钠；聚丙烯酰胺；絮凝剂
中图分类号：X703.1