



日昇半導體科技有限公司  
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# **Colloidal Palladium Recovery System**

## **Project Description**

## 1. Project Overview

PCB and plastic electroplating industry produce a large amount of colloidal palladium waste liquid, which has a high recycling value. If the environmental protection treatment cannot be carried out reasonably, it will cause serious waste of resources and on the other hand, heavy metals will infiltrate into the soil and water after being discharged. It will cause serious pollution and harm to the natural environment and our own health.

In recent years, the traditional colloidal palladium recovery equipment uses resin or activated carbon powder to absorb the palladium but the efficiency is only less than 20%. The operating cost is high, the efficiency is low and the complicated post-processing is required to extract pure palladium, resulting in increased costs and environmental protection. As a result, it is not widely adopted and what is more, it cannot be recycled at all.



Traditional Tower Type Recovery Equipment

In order to solve the above problems, our company has developed a new technology palladium recycling system.



## 2. Equipment Introduction

### 2.1 Project Description

Colloidal Palladium recovery System

### 2.2 Project Principle

- Simple and mature treatment technology to ensure the treatment effect and achieve energy saving. Emission reduction and reuse of valuable resources with clean production
- The system takes into account of high-tech, advanced knowhow and superiority with reasonable operating cost and convenient operation
- Reasonable use of layout, strong facility integration and minimize space occupation
- The system can be operated off-line or in-line without affecting normal production

### 2.3 Project Target

The recovery rate of palladium can reach more than 90% and the recovered product is high-purity metal powder sludge which has a high recovery value. It can reduce expensive and environmentally polluting post-processing and improves the overall efficiency of the enterprise.

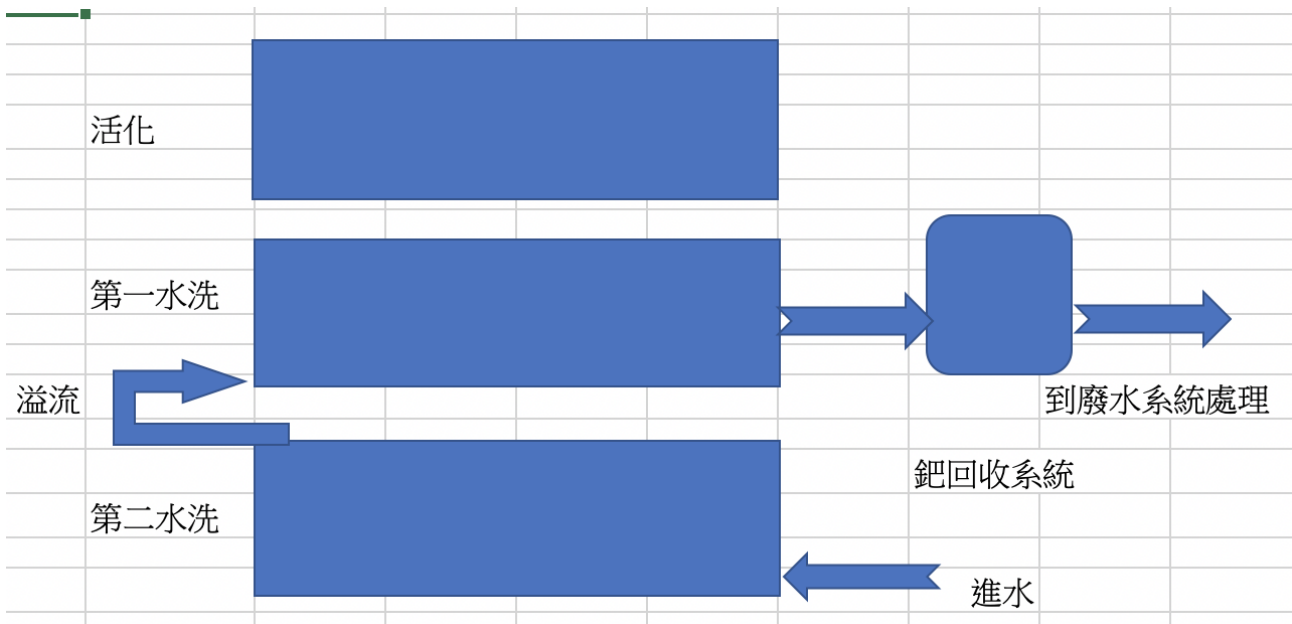
### 2.4 Project Object

- PCB Colloidal Pd Electroless Ni/Pd/Au Line

- PCB Colloidal Desmear / PTH Line
- Colloidal Pd POP Line

### 2.5 Project Process Flow Chart

- High concentration palladium waste liquid from the activator tank which needs to be replaced regularly can be recovered.
- Low concentration palladium waste from overflow rinsing tank after activator tank can be recovered
- Palladium containing filtered sludge from activator overflow rinsing tank can be recovered



### 2.6 Process Flow



Autodosing of chemical

Palladium sludge collection → High purity palladium product

b. Low concentration drainage → Unique chemical treatment → Palladium sludge →  
 precipitation

Autodosing of chemical

Palladium sludge collection → High purity palladium product

## 2.7 Recovered Product and Pd Content Analysis

### 2.7.1 Comparison of solution before and after treatment



Palladium containing wastewater before treatment



Recovered palladium containing powder after treatment

### 2.7.2 Recovered Product



### 2.7.3. Pd Content Analysis

永兴贵研检测科技有限公司  
报告编号: W20211026-YX-108

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#### 检测报告

委托方	廖桂林		
样品状态	其他	收样日期	2021-10-26
样品数量	2	报告日期	2021-10-27
主检测设备	天平 ICP-OES	检验类型	委托检测
检验方法	/		

#### 检测结果

样品名称	样品原编号	检测元素	检测结果
液体	/	钯	<1g/t
钯泥	/	钯	1187g/t
		水份	71.10%

以下空白

编制: 廖桂林      审核: 戴泳梅      批准: 孙志波

说明 1 本报告是提交给客户的最终产品, 盖章有效。2 检测结果(报告)仅对来样负责, 不承担因使用检测报告(结果)而引起的经济损失。3 对报告涂改无效。4. 对检测报告有异议时, 可在收到报告(或电话、电传、邮寄及网络获得的检测结果)之日起七日内向本公司提出, 逾期不予受理。公司地址: 湖南省郴州市永兴县经济开发区高新技术产业园; 电话: 0735-7771921.

BLXJC  
BAI LIXIN TESTING  
报告编号: 20220716009

百立鑫检测

#### 检测报告

1. 检测信息  
样品编号: BLX20220716009  
样品描述: /  
检测方法/仪器: 火试金富集原子吸收分光光度法
2. 检测结果: 见下表

样品	干基钯(克/吨)	水(%)	湿基钯(克/吨)
2022-7-4 钯锡泥	7499	38.12	4640

样品图片:

报告结束

本报告无百立鑫检测签字和盖章无效, 本报告检测结果只对被测样品负责, 未经百立鑫检测书面许可, 不可部分复制本报告。

Base on Activator Pd content 15ppm, the Pd content of the sludge product is 900~1187g/ton.

Base on Activator Pd content 63ppm, the Pd content of the sludge product is 5000~7499g/ton.

The Pd content of the water after treatment is <1g/ton

## 2.8 Pd Recovery Equipment



Approx. Space requirement: 2mW x 5mL x 3mH

## 3 Benefit of the Recovery System

1. The recovered efficiency is much higher (>90%) than the traditional recovery system (<20%)



2. No need to regularly change the resin, reduce environmental pollution when handling combustion of the resin
3. The process has a cleaning effect that can reduce the TOC & COD of the waste
4. All recovery processes are done inside the factory, customer can clearly understand the quantity (weight) of the product produced, no need to rely on the data provide by the recycler.

## 4. Joint Operation and Cooperation Mode (BOO)

### 1. Responsibility

- Customer is responsible for providing palladium water rinsing waste liquid / palladium filter sludge, space for equipment, water, electricity and arrangement for equipment to enter into the plant
- Our company is responsible for the design of the equipment and recycling scheme, equipment construction, daily operation, provision and maintenance of the adsorption chemical (customer do not need to invest any money)
- Our company is responsible for the sales of recycled products





## **2. Term of agreement**

- Five to Six years agreement after installation of equipment

## **3. Share proportion**

- The profit from palladium sales are divided into 30% for customer and 70% for our company

## **4. Sampling and analysis**

- Both parties work together

## **5. Promise**

- If palladium cannot be recovered within one week after installation, our company will remove the equipment for free.



**Table 4-1 Estimate Benefit Analysis For Plastic Electroplating Customers**

Item	Description		Unit
1	Monthly Pd Recovery (90%)	200	g
2	Palladium SMM price	50	USD/g
3	Recycler Purchase Discount	70	%
4	Pd Net Selling Price	35	USD/g
5	Total Monthly Pd Sales Revenue	7000	USD
6	Customer Share	30	%
7	Customer Monthly Revenue	2100	USD
8	Customer Yearly Revenue	25200	USD

**Table 4-2 Estimate Benefit Analysis For PCB Customers**



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Item	Description		Unit
1	Output	50000	m2/M
2	Activator Pd Con	50	ppm
3	Dragout	100	ml/m2
4	Pd Dragout Quantity	250	g
5	System efficiency	90	%
6	Monthly Pd recovery (90%)	225	g
7	Palladium SMM price	50	USD/g
8	Recycler Purchase Discount	70	%
9	Pd Net Selling Price	35	USD/g
10	Total Monthly Pd Sales Revenue	7875	USD
11	Customer Share	30	%
12	Customer Monthly Revenue	2362.5	USD
13	Customer Yearly Revenue	28350	USD

**The above data is calculated according to the monthly production of 500000 ft2 for PCB customers.**

**The above data is calculated according to the Activator Pd content >50ppm.**

**The above data are for reference only, the correct budget can only be made**



**according to the actual situation on site.**

## 5. Project Implementation Plan Cycle

The total construction period of palladium recovery and treatment system is about 20 days (Equipment production about 10 days, equipment installation, commissioning and operation lasts 3 days) + (Equipment commissioning about period 7 days) , The main construction tasks of the system include::

- 1、 Installation drawing design: (Including process, equipment placement, electrical, general drawing, etc) ;
- 2、 System installation: (Recovery tank, storage tank, pipeline, electrical circuit, etc) ;
- 3、 System commissioning: system and operator training, etc