

Complete Set of Equipment for Non- ferrous Metal Extraction

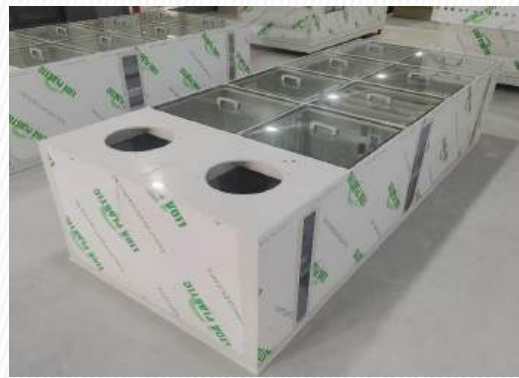
Gaohui Power Supply provides customers
with a one-stop service process



About Gaohui Power Supply

Guangzhou Gaohui Power Supply Technology Co., Ltd. is a national high-tech enterprise focusing on environmental governance technology services and the research and development and production of environmental protection equipment. It integrates environmental engineering design, construction, and commercial operation. The company has established a corporate headquarters, a research and development center, an experimental base, and a production base. Its business spans across China and more than 20 countries worldwide. It specializes in the comprehensive recycling and utilization of precious metal-containing wastewater generated during the production processes of PCB, mineral resources, hydrometallurgy, electroplating chemicals, semiconductors, new energy, and surface treatment industries. Actively responding to the national concepts of "carbon peaking" and "carbon neutrality," and adhering to the corporate spirit of "quality first, technological innovation, and service foremost," the company is willing to work with you to seek a sustainable development path in line with the social development trends of clean production, resource regeneration, and source control. We sincerely hope to achieve mutual benefit and win-win results with domestic and foreign customers, based in China, facing the world, and creating a brilliant future together.

Equipment/Production Showcase



Honors and Qualifications

Since its inception, the company has adhered to a market-oriented approach, with technological innovation as the core of its development. Through continuous innovation and upgrading, and by improving its scientific research and technology, it has successively passed software copyright, software product, patent certificates, and CE certification, and has received honors such as High-tech Enterprise, one of China's Top Ten Brands, and a Science and Technology-based SME. Meanwhile, the company's domestically developed and innovative products have gradually replaced imported products.



Product Catalogue

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Industry Background and Challenges



Industry Status

Industries such as PCB manufacturing, electroplating, and metallurgy generate large amounts of copper-containing wastewater during production. This wastewater has a complex composition and is difficult to treat.

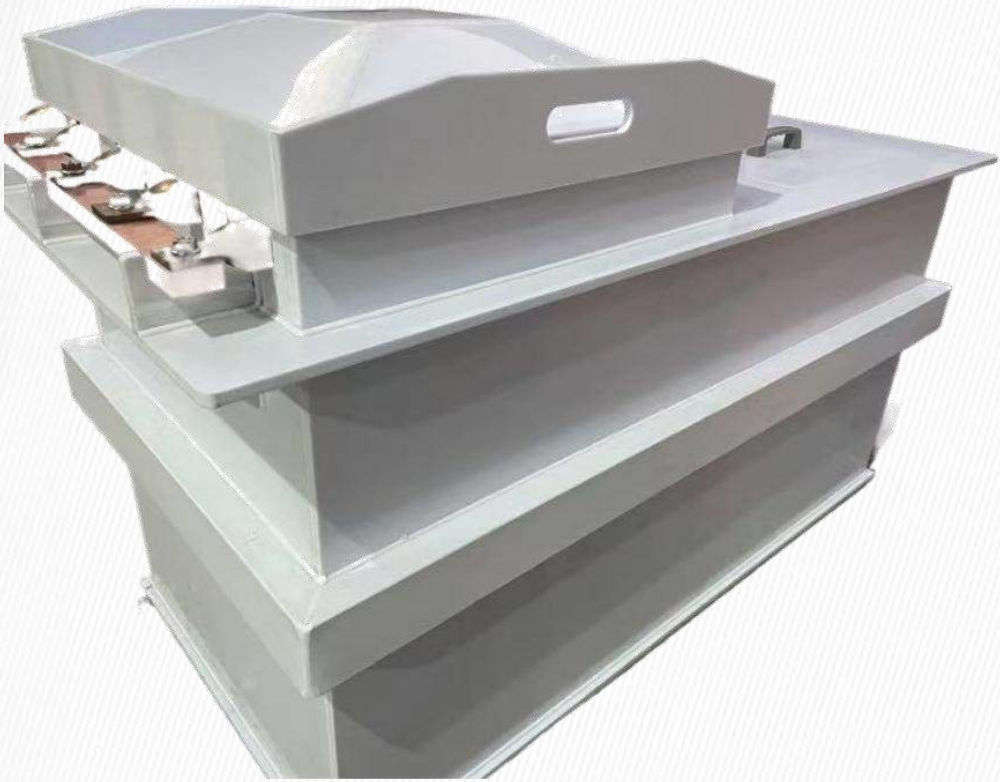
Traditional Pain Points

Traditional methods are costly, prone to secondary pollution, and have low copper recovery rates, failing to meet the needs of modern production.

Environmental Pressure

With increasingly stringent environmental policies, companies face enormous compliance pressure and urgently need green and efficient treatment technologies.

CU10 Copper Sulfate Electrolysis Equipment



► Applicable Scenarios

We provide professional treatment for copper sulfate wastewater generated by industries such as electroplating, PCB manufacturing, and metallurgy.

► Core Technology

High-efficiency electrolysis technology is used to convert copper ions in waste liquid into high-purity electrolytic copper plates.

► Economic Value

Turning waste into treasure significantly reduces environmental treatment costs, achieving a win-win situation of resource recycling and economic benefits.

I. Basic Equipment Data

Electrolytic copper output per unit:10kg

Copper content in effluent:2g/L

Potion type:copper sulfate solution

Product shape:electrolytic copper plate

Processing method and content:Offline electrolysis
(10-40g/L)



Physical Specifications

Floor space: 1 square meter (1×1m)

Working environment: Indoor



Equipment Material

Electrolytic cell material: PP (temperature resistant to 80°C, thickness ≥12mm)



Electrical Parameters

Power rating: 220V/50Hz

Installed power: 2KW

II. Technical Parameters Core

Core Electrolysis performance indicators

 Current density: 350 A/m²

 Current intensity range: 0 ~ 200 A

 Slot voltage: 3 V

Supporting System Configuration

Waste Gas Absorption System

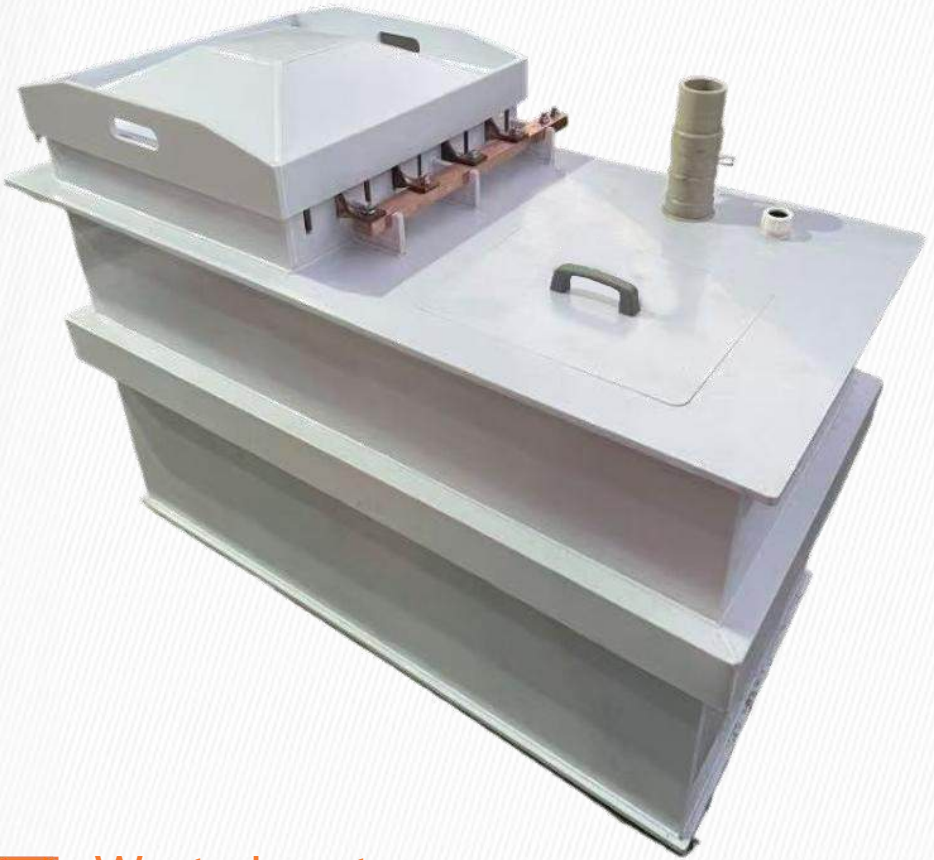
Equipped with a PP material absorption device, which is perfectly matched with the electrolytic cell to ensure environmental compliance.

 **Copper Electrolytic Rectifier Power Supply**
200A/12V specification, adopts high-efficiency air cooling technology, stable and reliable operation.

Electrolyte Circulation System

Includes a 100L circulation tank and a corrosion-resistant magnetic pump, ensuring uniform and stable electrolyte distribution.

III. Process Flow



Waste Input

Pump the copper sulfate waste liquid into the equipment and start the treatment process.



Electrolytic Treatment

When electricity is applied, copper ions are enriched at the cathode, forming a high-purity electrolytic copper plate.



Product Output

The finished electrolytic copper plates are periodically removed to complete resource recycling.



Waste Liquid Circulation

The treated low-copper waste liquid is returned to the production line, achieving a closed-loop cycle.

IV. Core Advantages and Product Showcase

Efficient recycling: High daily processing capacity, high resource recovery rate, and significantly improved processing efficiency.

Economic value: Turning waste into treasure, electrolytic copper plates can generate direct economic benefits and reduce operating costs.

Green environmental protection: Waste liquid is recycled, reducing wastewater discharge and meeting environmental standards and sustainable development.

Easy to operate: High degree of automation, low operation and maintenance costs, and reduced reliance on manual labor.



CU100 Copper Sulfate Electrolysis Equipment



►Product Features

The CU100 is a professional device for treating copper sulfate waste liquid. It can efficiently recover copper resources from the waste liquid and recycle the treated wastewater.

►Product Features

This equipment features large processing capacity, high copper recovery rate, low energy consumption, and simple operation, making it an ideal choice for enterprises to achieve clean production and resource regeneration.



Efficient Recycling

Copper recovery rate is as high as 99% or more.



Save Energy and Reduce Consumption

Unit energy consumption is lower than industry standard.



Intelligent Control

Automated operation, easy to use

I. Basic Equipment Data



Process Object and Concentration

It can treat copper sulfate solutions with a concentration range of 10-40 g/L, making it highly adaptable.



Efficient Processing Effect

A daily electrolytic copper process of 100 kg reduced the copper content in the effluent to below 2 g/L, demonstrating significant purification efficiency.



Product Capacity and Form

It produces high-purity electrolytic copper plates, with a single device having a monthly capacity of up to 3,000 kilograms (3 tons).



Flexible Operating Mode

It supports offline electrolysis mode and can be flexibly configured to operate online or offline according to on-site requirements.

II. Core Technical Parameters (Basic Requirements)



Floor Space Requirements

Each device requires only 10 square meters (approximately 4 meters × 2.5 meters), making high space utilization.



Power Configuration Requirements

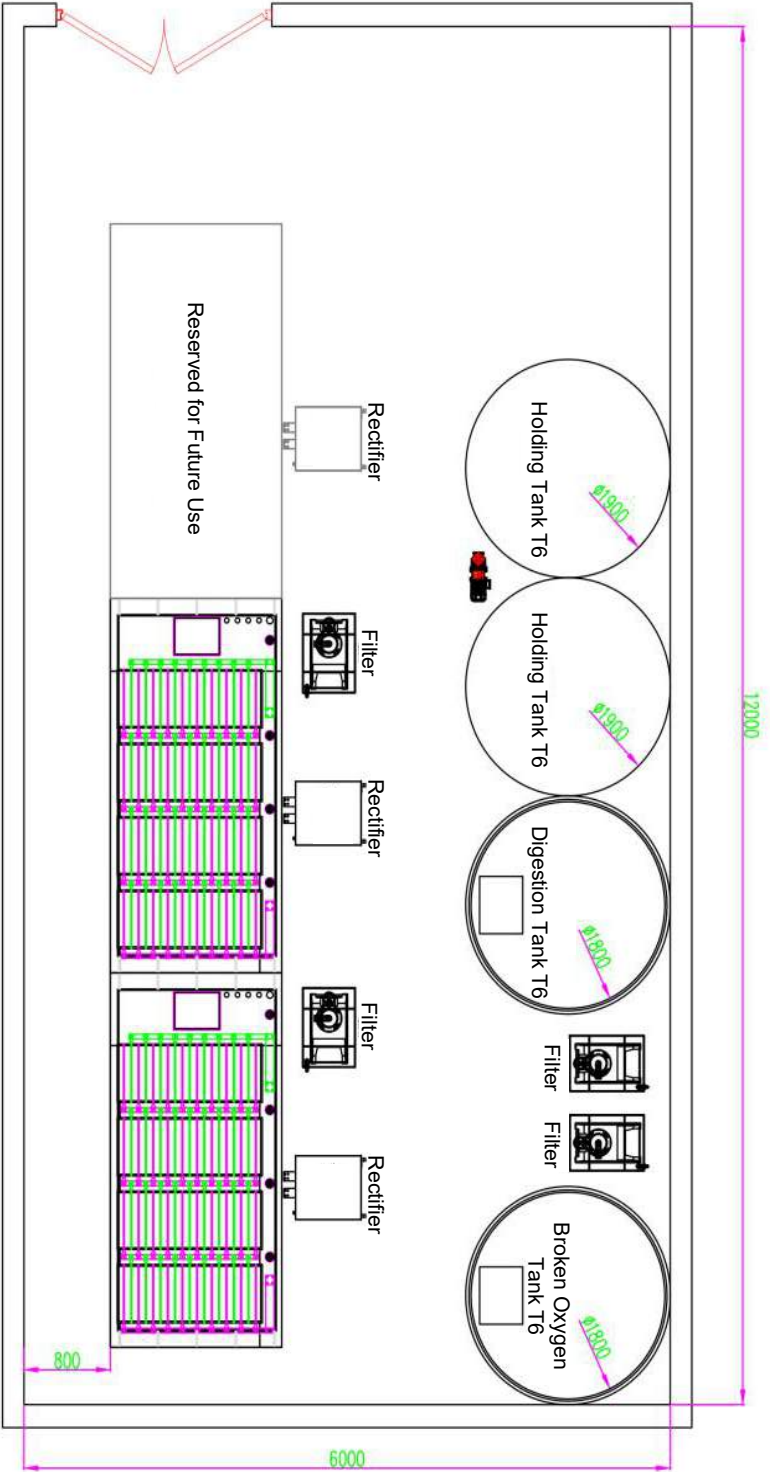
The system requires a stable power supply of 380V/50Hz three-phase electricity with a total installed power of 20kW.



Operating Environment Requirements

It needs to be installed indoors, avoiding direct sunlight and rain, to ensure a stable operating environment for the equipment.

Equipment Site Layout



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III. Key Technical Parameters (Main Equipment)



Copper Electrolytic Cell

- Material: PP (Polypropylene), highly corrosion-resistant
- Current: Max. 2000A (350A/m²)
- Cell Voltage: 3V; equipped with an ventilation system
- Production Capacity: 3000 kg/month (Electrolytic Copper)



Copper Electrolysis Rectifier Power Supply

- Specifications: 380V/50Hz, 2000A/12V
- Power: 20 kW, providing stable power support.
- Cooling: High-efficiency air-cooling design



Electrolyte Circulation Tank

- Capacity: 500L, PP Material
- Configuration: Built-in Cooling Coil
- Function: Ensures Stable Electrolyte Temperature



Copper Electrolyte Circulation Pump

- Type: Corrosion-Resistant PP Fiber-Reinforced Magnetic Drive Pump
- Power: 0.75 kW (Reference)
- Flow Rate: 10 m³/h
- Head: 20 m (Ensures efficient circulation)



Cooling Tower

- Specifications: 50T; Cooling Capacity:24089Kcal/h 16.95kw
- Temperature Control: Precise control within 5–35°C
- Equipment Power: 10 kW
- Function: Ensures stable and efficient electrolytic reactions



System Advantages

- Compact overall design with a small footprint
- Fully automated process control; easy to maintain
- Energy-efficient and eco-friendly; low operating costs

IV. Process Flow Analysis



Core Principle: Through an electrolytic process, copper ions are concentrated to form marketable copper plates; the waste liquid undergoes treatment to significantly reduce its copper content, enabling either reuse or discharge in compliance with regulatory standards.



Mode 1: Offline Centralized Processing

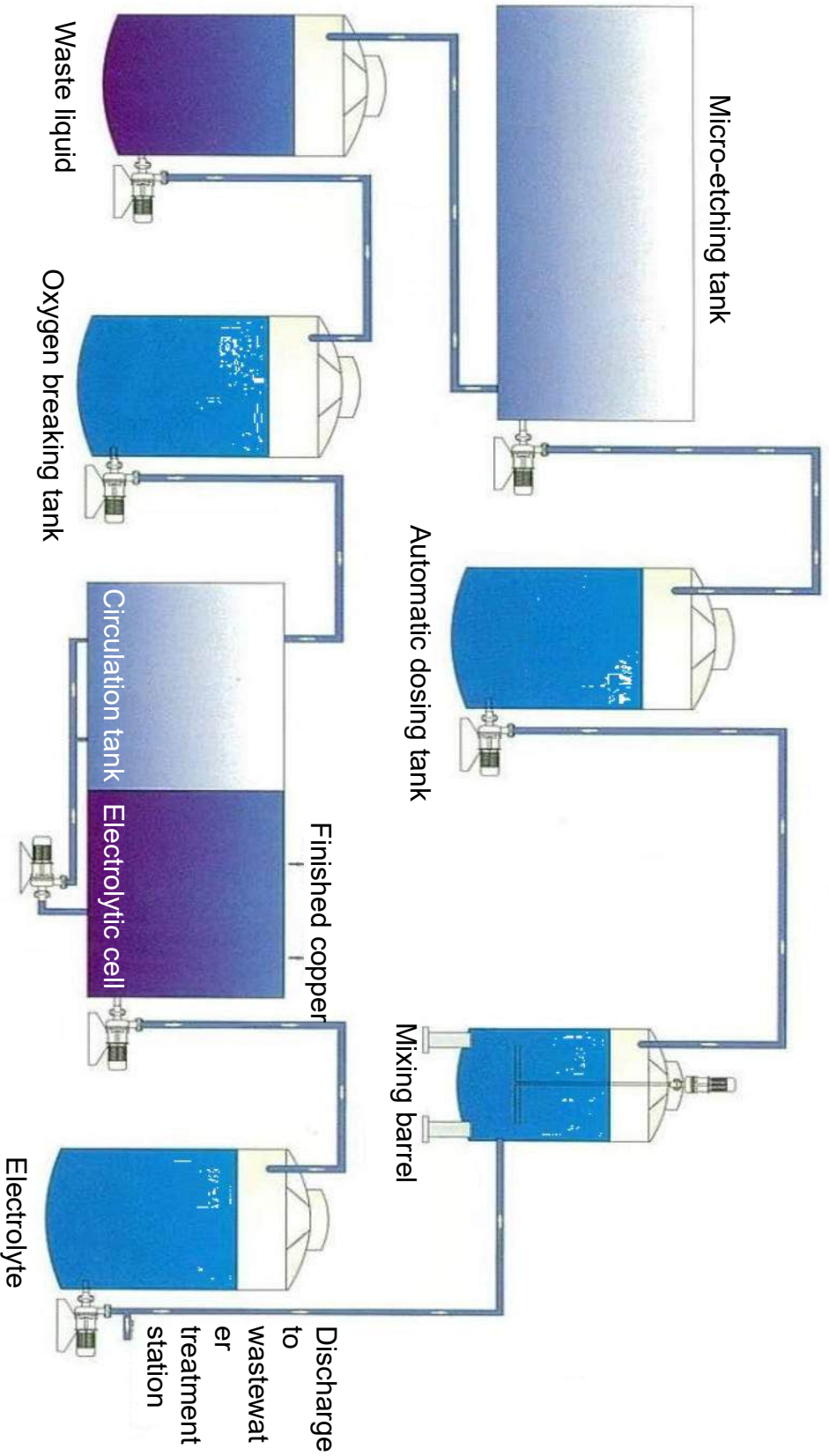
1. Waste Liquid Collection → Temporary Storage in Collection Tank → Transfer Storage Tank
2. Conveyance to Circulation Tank for Homogenization
3. Entry into Electrolytic Cell; Cathodic Enrichment to Form Electrolytic Copper Plates
4. Discharge Meeting Standards / Reuse within Production Line



Mode 2: Online Real-time Processing

1. Direct extraction of waste liquid from the production line's copper-washing tank.
2. Rapid transfer to the circulation tank and electrolytic cell for processing.
3. Simultaneous recovery of electrolytic copper plates and purification of waste liquid.
4. Direct reuse within the production line / Conveyance to the wastewater treatment station.

Process Flow Diagram



V. Installation and Operation Requirements

Cooling Water Supply: 50 m³/h capacity with 2.5-inch pipe connections, ensuring a stable supply.

Power Load: Single device: 20 kW; power lines to be connected to the designated location on-site.

Exhaust Gas Treatment Port: With a single-unit processing capacity of 1,000 m³/h, and is equipped with relevant facilities and connected to the designated location on site

Tap Water Supply: 5 m³/h; 1-inch pipe connection; the water supply line is connected to the designated location on-site.

Floor Height Requirements: The height from the ceiling beams to the floor at the installation site must be no less than 3.5 meters.



<< Picture of Multiple Electrolysis Equipment

Picture of a Single >> Electrolysis Equipment



Copper Extraction System with Acidic Etching Solution

Process Description

This process employs the "Ion Membrane Electrolytic Copper" technique. In this method, an ion membrane is utilized to partition the electrolytic cell into two distinct zones: an anode zone and a cathode zone. The anode zone serves as the waste etchant regeneration area; here, through electrochemical reactions, monovalent copper ions present in the copper-depleted waste etchant are converted into divalent copper ions, thereby regenerating the etchant. The cathode zone functions as the copper recovery area; facilitated by the ion membrane—which selectively directs the migration of ions within the solution—copper ions in the solution gain electrons and undergo reduction to form metallic copper.

Technical Features

1. A fully closed-loop recycling system with zero emissions of waste. Simultaneously, the waste etching solution is regenerated, and the regenerated etching solution can be recycled.
2. Copper ions in the waste etching solution are recovered and reduced to electrolytic copper of high purity or higher, resulting in a high copper recovery rate.
3. High production efficiency, a small footprint.



Alkaline Etching Solution Copper Extraction System

Extraction Electrolysis Process Description

The alkaline [etching solution recovery and regeneration system] equipment adopts the "extraction separation-electrodeposition of copper" process. "Extraction separation" separates copper ions from the waste etching solution, regenerating it. The regenerated etching solution, after parameter adjustments, is returned to the etching machine for reuse. "Electrodeposition of copper" involves electrodepositing the extracted copper ions into high-purity electrolytic copper.

Technical Features

1. The waste etching solution is regenerated and can be recycled.
2. Copper ions in the waste etching solution and ammonia washing water are recovered and reduced to high-purity copper with a high copper recovery rate.
3. The equipment is simple to operate and maintain, and production is not affected during installation and commissioning. It can be put into use immediately after installation and commissioning.



Copper Recovery System for Micro-etch Waste Liquid

Process Description

Electrolytic oxidant removal—a copper electrodeposition process—is used to treat micro-etching wastewater.

In this process, after the equipment is used, the micro-etching wastewater is reduced under the reducing action of the electrode cathode, causing oxidants such as sodium persulfate, ammonium persulfate, and hydrogen peroxide to be reduced from a high concentration to zero.

Technical Features

1. The copper electrodeposition process occurs after the oxidant is reduced.
2. Equipment is used to reduce Cu^{2+} to elemental copper in the micro-etching waste liquid under the reducing action of the electrode cathode.
3. This reduces the Cu^{2+} concentration in the waste liquid, making it easier for wastewater treatment and discharge.
4. It alleviates the pressure on environmental protection for Cu^{2+} treatment and yields an economically valuable byproduct—electrolytic plate-shaped copper.



Electrolytic Nickel Equipment

Nickel electrolysis equipment is a specialized device for treating high-concentration nickel-containing wastewater. After treatment, most of the nickel metal in high-concentration nickel sulfate wastewater can be removed, and the treated wastewater can then be processed in a general wastewater treatment plant. During the wastewater treatment process, metallic nickel plates can be obtained and sold directly, generating considerable economic benefits.

Nickel electrolytic extraction equipment primarily utilizes electrolysis to treat high-concentration nickel-containing wastewater.

A specially made rare metal plate serves as the anode, and a stainless steel plate as the cathode. Under electrolysis, nickel metal ions in the wastewater accumulate on the stainless steel cathode, forming a nickel plate. After the nickel on the stainless steel plate reaches a certain thickness, the cathode plate is removed, yielding a high-purity nickel metal plate.



Tin Stripping Cycle Regeneration System

Process Description

The tin stripping waste liquid regeneration and tin recovery process involves adding special precipitants and flocculants to the tin stripping waste liquid to selectively precipitate metallic tin and copper ions. The precipitate and the supernatant are then separated by a solid-liquid separation device, yielding tin sludge with a tin content of 30% and a clear filtrate. After the filtrate undergoes composition adjustment to meet the requirements of the tin stripping production process, it is returned to the tin stripping production line via an automatic control addition system, thus achieving resource recycling and zero waste discharge.

Technical Features

1. The regenerated tin stripping solution has stable performance and works just as well as the new solution, so it can be reused normally.
2. The waste gas tower is equipped with an automatic replenishment control device, which regularly calibrates and inspects the sensor probes to prevent emissions.
3. All storage containers are equipped with dual high liquid level sensor alarm to prevent solution leakage.
4. The regeneration solution can be 100% reused.
5. The equipment has a small footprint and low investment cost.



Brown Waste Liquid Electrolytic Copper System

For the Process of Browning Waste Liquid

Traditional treatment methods involve adding chemical reagents for precipitation, resulting in high operating costs and low added value. While electrolysis is commonly used to treat browning liquid the high content of corrosion inhibitors in the waste liquid makes it prone to film formation. During electrolysis, a film easily forms on the cathode surface, increasing resistance, energy consumption, and hindering copper deposition.

Furthermore, the large number of copper ions in the waste liquid exist in a complexed form, making direct electrolysis impossible. To address the difficulty in electrolyzing browning liquid, our company has developed a novel copper recovery and treatment system. This system pre-treats the waste liquid, allowing for direct electrolytic copper extraction.

Technical Features

1. The cathode copper obtained by electrolysis has a high purity, reaching over 96%.
2. The waste gas tower is equipped with an automatic replenishment control device, which regularly calibrates and inspects the induction probes to prevent unauthorized emissions.
3. All storage containers are equipped with dual high liquid level induction alarm to prevent solution leakage. Twice direct electrolysis methods are used. First, the hydrogen peroxide in the waste liquid is broken down by electrolysis, then enters the electrolytic cell or cyclone electrolytic tank. After copper electrolysis, a small amount of reagent is added, thus enabling effective recovery and recycling of the micro-etching solution.
4. It can reduce the COD value of the original solution by more than 90%.
5. The equipment has a small footprint and low investment cost.



Ammonia Nitrogen Electrolysis Water Treatment System

Process Description

By conducting chemical reactions under electrical conditions, electrochemical oxidation and reduction reactions occur at the anode and cathode, respectively. These chemical reactions transform certain easily soluble or soluble pollutants in wastewater into substances that are poorly soluble in the solution, thereby achieving the purpose of removing various pollutants.

Advantages of electrochemical methods over traditional methods

1. The free radicals generated during the process may react directly with organic pollutants in the wastewater and degrade them into carbon dioxide, water and simple organic matter, with little or no secondary pollution.
2. The experiment can be made more controllable by changing the applied voltage and current and adjusting the reaction at any time. Electron transfer only occurs between the electrodes and the wastewater, without the need to add additional oxidizing or reducing agents, thus avoiding secondary pollution caused by adding additional chemicals.
3. If the scale of wastewater discharge is small, on-site treatment can be achieved.
4. The reaction conditions are mild; under normal conditions, the electrochemical reaction can be carried out at room temperature.
5. It also has the functions of flotation, disinfection, and flocculation.



Cyclone Electrolytic Copper Recovery System

Process Description

The direct electrolysis method was adopted twice. First, the hydrogen peroxide in the waste liquid is broken down by electrolysis, allowing it to then enter the electrolytic cell or cyclone electrolytic tank. After the copper is electrolyzed, a small amount of reagent is added, enabling the effective recovery and recycling of the micro-etching solution.

This equipment avoids the limitations of traditional electrolysis processes caused by various factors (ion concentration, deposition potential, concentration polarization, overpotential, pH, etc.), enabling highly efficient and high-purity electrolytic extraction of low-concentration solutions, with metal recovery rates reaching the ppm level. Cathode copper recovery can reach 99.99%. The closed-loop solution circulation effectively prevents environmental pollution from electrolysis waste gas. The modular and portable design facilitates expansion and relocation, and operation is simple.



Copper Powder Recovery Water Treatment System

The fully automatic filter recovery machine differs from the backwash self-cleaning water filter. This filter is not only used for water filtration but is also widely applicable for self-cleaning filtration of viscous materials such as solvents, acids, alkalis, polymers, and coatings. It offers higher efficiency, a precision range of 5-1500 micrometers, and can handle liquids with viscosities up to 800,000 centipoise. Applications include water treatment, petrochemicals, metallurgy, power generation, fine chemicals, coatings, inks, papermaking, food and beverage, pharmaceuticals, and metal processing industries.

Technical Features

1. Fully automatic filter recovery machine: Operates automatically, with high filtration accuracy and stable, reliable performance. It is a replacement for traditional manual filters
2. A cost-effective choice for media filters: Liquid flows in from the filter inlet, descends from top to bottom, passes through the filter element surface, and flows to the outlet.
3. When a certain amount of impurities is collected, the liquid containing the high concentration of impurities is discharged. The discharged residue can be recycled or discharged.



Precious Metal Extraction and Recovery System

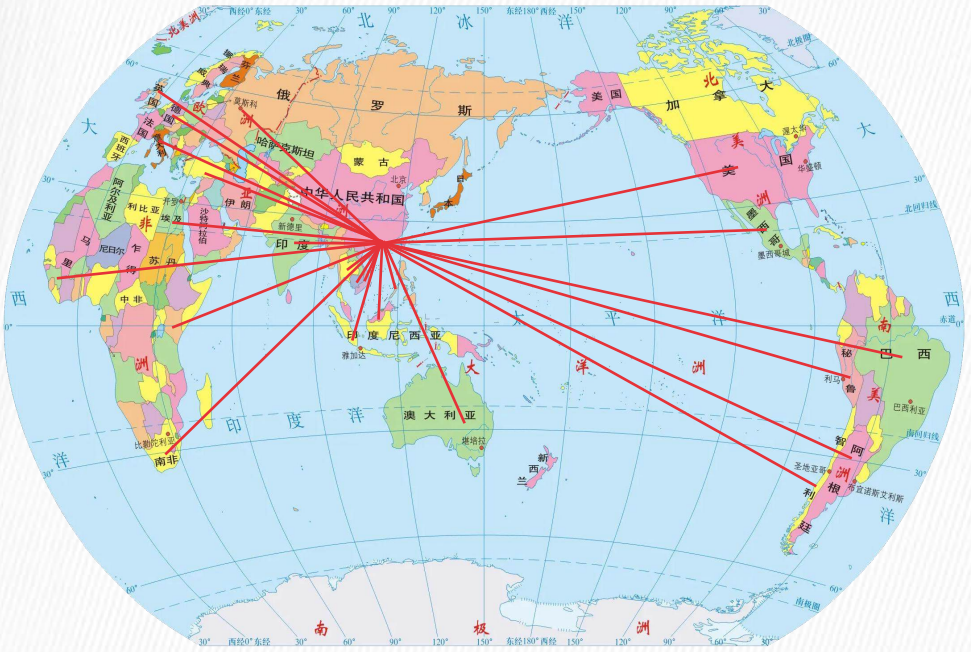
1. This equipment uses a rotating cathode and high-frequency pulse method for intelligent electrolytic recovery. No chemical reagents are added, and only a small amount of electricity (150-250W) is used, so there is no concern about secondary pollution.
2. This equipment is small and compact in size, easy to operate, and does not require special personnel to supervise it; it adopts a fully anti-corrosion design, and the machine parts have a long service life; it has a large processing capacity, and after combination, it can treat more than 6,000-18,000 liters of silver-containing wastewater per month, while the processing capacity of gold-containing wastewater is halved.
3. The recovery rate is over 99%, and gold with a purity of 95-99.8% or higher can be directly extracted.
4. Precious metal content in the treated waste liquid: silver can be less than 5-20 ppm, and gold can be less than 2-10 ppm.
5. This equipment does not require any consumables or electrolytic accelerators, resulting in very low operating and maintenance costs.



Industry Application Cases



Global Suppliers



Asia 亚洲:

- Japan——日本
- Korea——韩国
- Philippines——菲律宾
- Cambodia——柬埔寨
- Malaysia——马来西亚
- Myanmar——缅甸
- Thailand——泰国
- Vietnam——越南
- Singapore——新加坡
- Indonesia——印度尼西亚
- Pakistan——巴基斯坦
- India——印度
- Iran——伊朗
- Turkey——土耳其

Africa 非洲:

- Egypt——埃及
- Guinea——几内亚

Europe 欧洲:

- Germany——德国
- Russia——俄罗斯
- U.K.——英国
- Italy——意大利

North America 北美洲:

- U.S.——美国
- Mexico——墨西哥

South America 南美洲:

- Peru——秘鲁
- Brazil——巴西
- Chile——智利
- Argentina——阿根廷

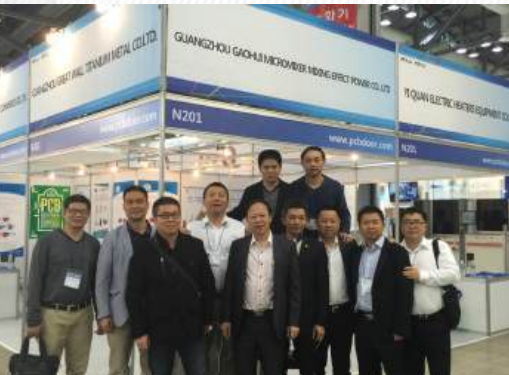
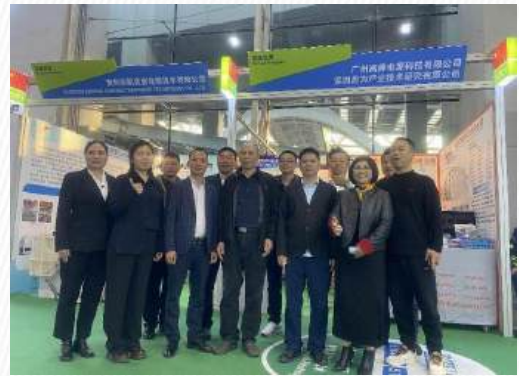
Oceania 大洋洲:

- Australia——澳大利亚
- Kenya——肯尼亚
- South Africa——南非

Partners 1

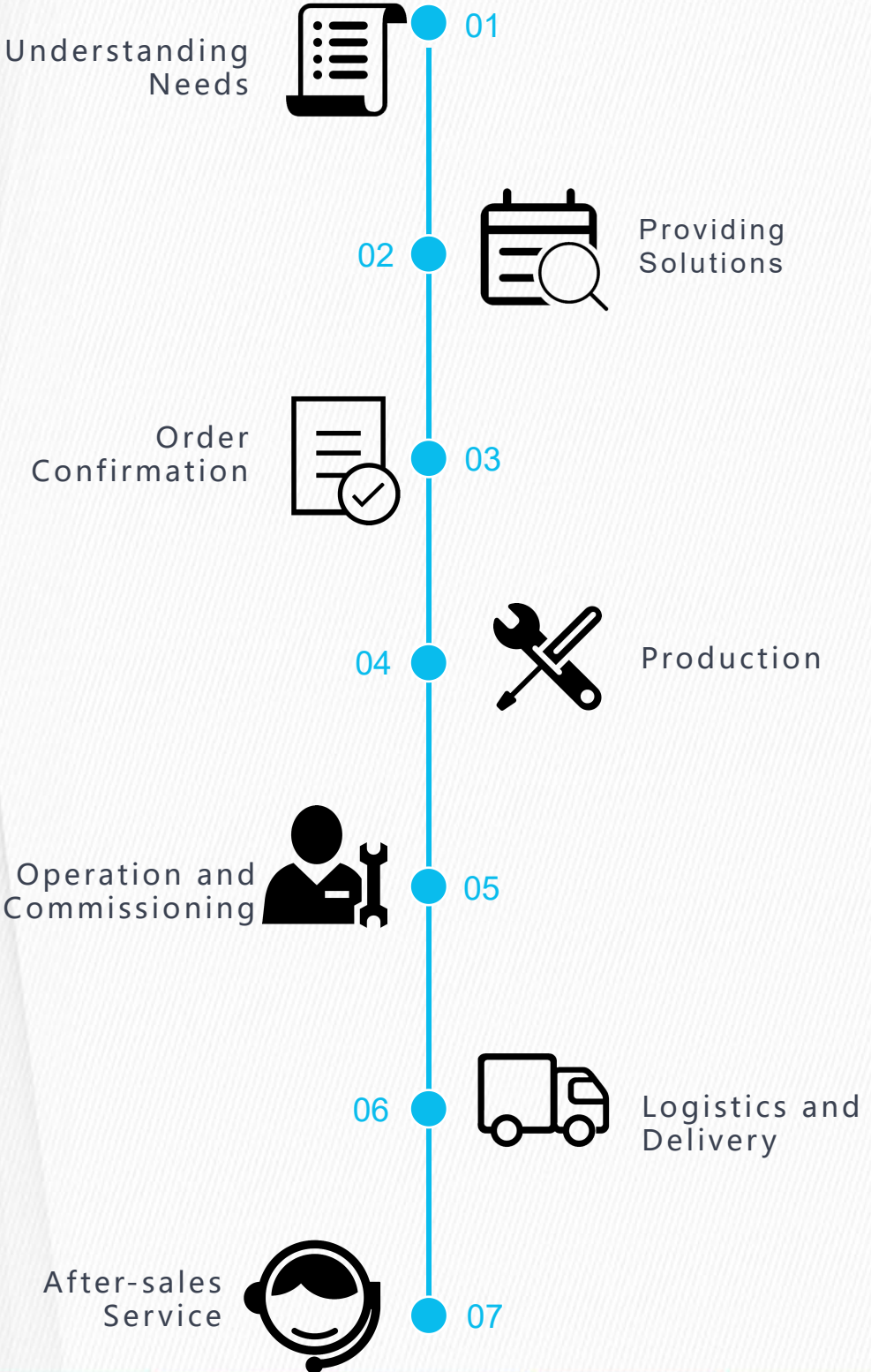


Partners 2



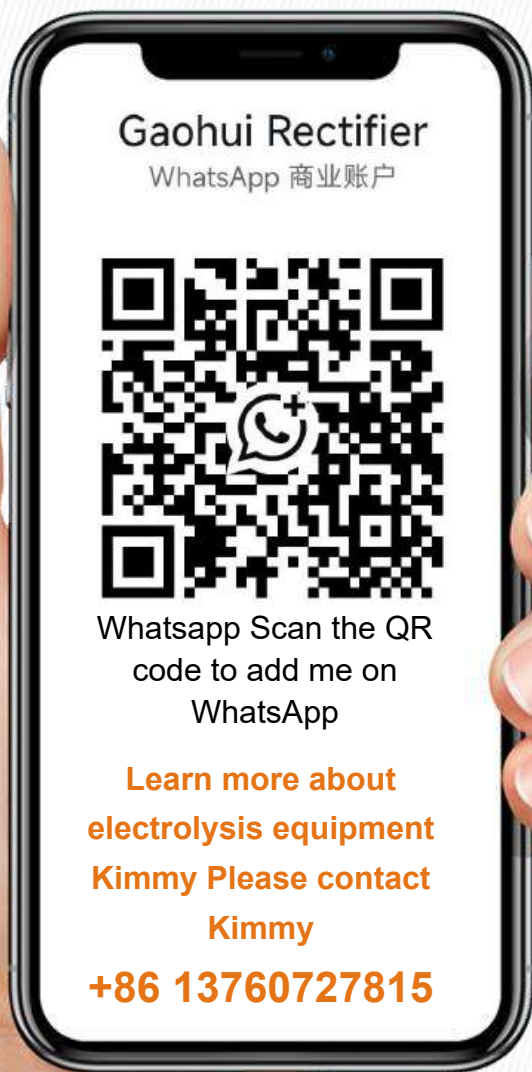
Business Introduction

Gaohui provides a one-stop service process for its clients





Thank U for Watching



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