Activated carbon for electroplating

Primarily used for the precision finishing of metals, including nickel plating, hydrogenated copper plating, silver plating, copper-tin alloy plating, HEDP copper plating, and solder plating. The product exhibits excellent adsorption properties, ensuring that the plated layers remain non-vulnerable and preventing the occurrence of flaking or pitting on the plated surfaces.

Technical specifications for activated carbon for electroplating:

project		metric
Particle size: 50–80 mesh	%	≥90
iodine sorption value	mg/g	≥950
Methylene blue adsorption capacity	ml	≥9
Apparent density	g/ml	≤0.45
Moisture	%	≤10
Filterable ash	Yields a negative result in the HEDP plating solution.	
For items not specified in the quality indicators, suitable activated carbon products for electroplating may be manufactured in accordance with customer requirements.		

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Application areas of activated carbon for electroplating:

Activated carbon for electroplating is primarily used to remove impurities from electroplating baths and to treat electroplating wastewater. Its application in the purification and impurity removal of electroplating baths serves as one of the critical measures for enhancing the quality of plated parts, ensuring a uniform coating, fine crystallinity, low porosity, and strong adhesion. In an electroplating tank, after preparing the electroplating bath and stirring it, the activated carbon for electroplating is added; subsequent stirring for approximately half an hour allows the activated carbon to gradually settle, thereby completing the purification and impurity removal process.

Application of activated carbon for electroplating:

In the electroplating tank, after stirring the prepared electroplating solution, add the electroplating-grade activated carbon, and continue stirring for approximately half an hour; this will allow the activated carbon to gradually settle.

Precautions for using activated carbon to purify electroplating baths:

(1) Select an appropriate activated carbon product. Activated carbon available on the market comes in two forms: granular and powdered. While granular activated carbon offers greater convenience for filtration, its treatment efficiency is significantly lower than that of powdered activated carbon; this is due to the substantially larger specific surface area of powdered activated carbon compared to its granular counterpart. The appropriate type should be selected based on the degree of contamination in the plating bath.

(2) Activated carbon shall be free of impurity ions that could be detrimental to the plating bath. Currently, the primary raw materials for producing activated carbon are wood, coal, and the shells of hard nuts (e.g., coconut shells). Practical experience has demonstrated that in the purification of plating baths, activated carbon derived from hard nuts is superior to that derived from coal. Inferior-grade activated carbon often contains significant amounts of impurities such as zinc and should therefore not be used. If such activated carbon containing zinc impurities is employed in the purification of nickel plating baths, it may lead to even more severe contamination consequences—a phenomenon that is not uncommon.

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(3) Ensure sufficient dosage. For plating baths contaminated by organic impurities to varying degrees, an appropriate dosage—typically 2−5 g/L—should be employed; insufficient dosage may result in suboptimal treatment performance. Alternatively, a small-scale pilot test tank or a Hahn cell may be used to determine the appropriate amount of activated carbon through preliminary trials.

(4) The temperature and pH of the plating bath to be treated should be appropriate. For most plating baths, optimal treatment results are achieved under

conditions of 55−70 °C and pH 5−6. Throughout the entire treatment process, both temperature and pH must be maintained at stable levels.

(5) The stirring must be thorough and uniform. It is advisable to employ intermittent stirring using recirculating filtration and compressed air; if manual stirring is used, it should be performed continuously throughout all areas of the plating bath, ensuring that no dead zones remain. The stirring duration should generally be 2−4 h.

(6) Standing time. After the adsorption process is complete, the plating bath should be allowed to stand for a period of 6−12 h before filtration; following thorough sedimentation, filter the bath 2−3 times until no residual powdered activated carbon remains in the plating bath and the bath assumes its inherent color (free of carbon black).

(7) Prevent desorption. In electroplating processes employing continuous recirculating activated carbon filtration, when the activated carbon becomes saturated, the activated carbon in the filter cartridge should be promptly cleaned and replaced to prevent desorption, which could otherwise lead to re-contamination of the plating bath by impurities.

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Solvent recovery activated carbon

Solvent recovery activated carbon generally refers to activated carbon used for organic solvent recovery, primarily employed in high-end air purification systems or for various gas solvent recovery applications; it commonly utilizes coal-based columnary activated carbon, coconut shell granular activated carbon, and coconut shell columnary activated carbon.

Activated carbon used in solvent recovery exhibits high selectivity, mechanical strength, thermal stability, chemical stability, and considerable adsorption capacity. Additionally, both the adsorption and desorption rates of the adsorbent must be rapid to ensure excellent regeneration performance. Compared

to adsorbents such as zeolite molecular sieves and activated alumina, activated carbon is a nonpolar material that demonstrates strong affinity for organic solvents; even in the presence of moisture, its adsorption performance is only slightly compromised, and it is also cost-effective. Consequently, activated carbon adsorption has become a preferred approach in contemporary solvent recovery processes.

Applications of activated carbon for solvent recovery:

It finds extensive application across a wide range of industries, including petrochemicals, pharmaceuticals, fine chemicals, electronic components, plastic printing, coatings, film production, adhesive products, wax paper, fibers, plastics, synthetic leather, papermaking, and textiles.

Explosives and pyrotechnic production: recovery of ethanol and other organic solvents.

Printing and inks: Recovery of organic solvents, including benzene, toluene, xylene, ethanol, and crude gasoline.

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Dry cleaning and metal degreasing: recovery of organic solvents such as gasoline, benzene, and carbon tetrachloride.

Synthetic fiber production: recovery of organic solvents such as ethanol and carbon disulfide.

Rubber industry: Recovery of organic solvents such as gasoline, benzene, and toluene.

Celluloid: Recovery of organic solvents, including ethanol.

Film production: Recovery of organic solvents, such as ethanol and dichloromethane.

Oil and gas production: Recovery of organic solvents such as benzene, toluene, and xylene.

Foil production: Recovery of organic solvents, such as ethanol and dichloromethane.

Activated carbon parameters for solvent recovery:

project name	qualification	qualification
Material	Coconut shell columnar	Coal quality columnar
size	2mm/3mm/4mm	2mm/3mm/4mm
iodine value mg/g	≥900	≥900
Ash content (%)	≤3	≤10
Moisture %	≤5	≤5
Hardness %	≥98	≥98
Filler specific gravity: g/ml	0.45-0.55	0.45-0.55
PH	>7	>7

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Activated carbon for vapor recovery

Activated carbon adsorption is one of the primary processes for vapor recovery of oil and gas. First applied in the United States in the 1970s, this technology has now been widely adopted worldwide. This process is relatively simple and offers high recovery efficiency, making it particularly suitable for gasoline vapor recovery. The underlying principle is to leverage the difference in binding affinity between the components of the oil-gas mixture and the adsorbent (activated carbon), thereby separating the less adsorbable components from the more readily adsorbable ones; the hydrocarbons are then adsorbed by the

adsorbent. The adsorption process occurs under ambient temperature and pressure. Once the adsorbent reaches a certain degree of saturation, it requires regeneration; during this regeneration phase, the desorbed oil and gas vapors are absorbed by a suitable absorbent medium.

Oil and gas recovery process:

1. Adsorption. Oil and gas are collected in a sealed containment within the refueling area, then conveyed via pipelines under low pressure into an adsorption tower. Approximately 99% of the oil vapor in the oil and gas mixture is adsorbed by the activated carbon within the tower, while air and other gases are discharged into the atmosphere; no chemical reactions occur during this adsorption process.

2. Desorption. Once the adsorbent reaches saturation, a dry vacuum pump and compressor are activated to perform desorption of the activated carbon bed in the adsorption tower via a vacuum process, thereby yielding high-concentration oil vapor. This oil vapor is then compressed and fed into the absorption tower, while the desorbed activated carbon regains its original functionality, enabling it to perform the next cycle of oil-gas adsorption.

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3. Absorption. Once the oil vapor enters the absorption tower, it flows in the opposite direction to the gasoline absorbent within the packing bed; the vast majority of the oil vapor is dissolved and absorbed by the gasoline in the spray tower, converting it into liquid gasoline. The small amount of unabsorbed oil vapor is then conveyed via pipelines to the adsorption tower for further adsorption, thereby achieving the goal of recovery.

Introduction to Columnary Carbon for Oil and Gas Recovery:

Light petroleum products, such as gasoline, exhibit high volatility, leading to significant vapor loss during storage, transportation, and use; activated carbon for vapor recovery can effectively recover these vapors. Butane offers numerous advantages, including a large working capacity, excellent adsorption and desorption performance, low gas flow resistance, low specific gravity, and the

capability for repeated regeneration. It can be effectively deployed across a wide range of industries, including petrochemicals, synthetic leather, textile dyeing and printing, as well as paints and coatings, rubber and plastics, pharmaceuticals, electronics, chemical fibers, and brewing.

Utilizing activated carbon for selective adsorption of oil and gas enables the adsorption and recovery of oil vapor, representing an effective oil and gas recovery technology. The selection of the adsorbent is therefore critical to this technology. Activated carbon adsorption of oil and gas primarily involves a non-polar physical adsorption process driven by van der Waals forces; its adsorption capacity depends on key physical structural parameters of the activated carbon, such as specific surface area, pore volume, and pore size distribution. The adsorption capacity increases as the diameter of the hydrocarbon molecules approaches that of the activated carbon pores. Activated carbon used in oil and gas recovery is typically required to possess a well-developed network of medium pores; it must not only exhibit strong adsorption capacity but also demonstrate high desorption capability, along with high mechanical strength, wear resistance, and permeability.

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Applications of columnar carbon in oil and gas recovery:

Catalytic carbon columns for vapor recovery are used in various types of oil refineries, oil depots, gas stations, and small vehicles, making them suitable for processes such as adsorption, absorption, and condensation adsorption.

Catalytic column parameters for oil and gas recovery:

Item	Activated carbon for oil and gas recovery
surface	Black columnar particles
diameter	2-4mm
Moisture (%)	≤5

Filling density (g/L)	300-450
Benzene adsorption capacity (%)	30-65
BWC(g/100ml)	8-12
Butane activity (%)	28-50
pH	7-11

Note: Production can be customized based on user-specific criteria.

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