Dear Client,

Thank you for purchasing our UHV-660 Electrolytic Oil Moisture Analyzer. Please read the manual in detail prior to first use, which will help you use the equipment skillfully.

Our aim is to improve and perfect the company's products continually, so there may be slight differences between your purchase equipment and its instruction manual. You can find the changes in the appendix. Sorry for the inconvenience. If you have further questions, welcome to contact with our service department.

The input/output terminals and the test column may bring voltage, when you plug/draw the test wire or power outlet, they will cause electric spark. PLEASE CAUTION RISK OF ELECTRICAL SHOCK!

Company Address:

- **T4， No. 1, High-tech 2 Road，East Lake High-tech Development Zone， Wuhan**
- Sales Hotline: 86-27- 87492243
- After Service Hotline**:** 86-27- 87459656
- Fax: 86-27- 87803129
- E-mail: qiao@hvtest.cc
- Website: www.cnuhv.com

◆ SERIOUS COMMITMENT

All products of our company carry one year limited warranty from the date of shipment. If any such product proves defective during this warranty period we will maintain it for free. Meanwhile we implement lifetime service. Except otherwise agreed by contract.

◆ SAFETY REQUIREMENTS

Please read the following safety precautions carefully to avoid body injury and prevent the product or other relevant subassembly to damage. In order to avoid possible danger, this product can only be used within the prescribed scope.

Only qualified technician can carry out maintenance or repair work.

--To avoid fire and personal injury:

Use Proper Power Cord

Only use the power wire supplied by the product or meet the specification of this produce.

Connect and Disconnect Correctly

When the test wire is connected to the live terminal, please do not connect or disconnect the test wire.

Grounding

The product is grounded through the power wire; besides, the ground pole of the shell must be grounded. To prevent electric shock, the grounding conductor must be connected to the ground.

Make sure the product has been grounded correctly before connecting with the

input/output port.

Pay Attention to the Ratings of All Terminals

To prevent the fire hazard or electric shock, please be care of all ratings and labels/marks of this product. Before connecting, please read the instruction manual to acquire information about the ratings.

Do Not Operate without Covers

Do not operate this product when covers or panels removed.

Use Proper Fuse

Only use the fuse with type and rating specified for the product.

Avoid Touching Bare Circuit and Charged Metal

Do not touch the bare connection points and parts of energized equipment.

Do Not Operate with Suspicious Failures

If you encounter operating failure, do not continue. Please contact with our maintenance staff.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmospheres.

Ensure Product Surfaces Clean and Dry

—Security Terms

Warning: indicates that death or severe personal injury may result if proper precautions are not taken

Caution: indicates that property damage may result if proper precautions are not taken.

Contents

I. General

micro moisture meter is a new development of the determination of trace water analysis instrument, the instrument uses high resolution color touch LCD display, convenient man-machine conversation, intuitive and easy to operate. The instrument adopts the high performance ARM processor with large data storage capacity, running fast and stable performance and excellent anti - jamming performance, which has outstanding advantages of high detection speed and high precision. The instrument has the fault diagnosis function, the end of the test, display and print results. Instrument has potential is measured dynamic curve indicating function, makes the test more intuitive; instruments and data storage capacity up to store 500 data records; instrument has delay measuring function, is very effective in the testing of lower moisture content of specimen; instrument adopts the sliding touch control the stirring speed control; water content calculation formula contains calculated according to the volume and weight of the key parameters of various algorithms; testing process, such as the need to modify the formula for calculating the related parameters, can be modified in a timely manner and does not affect the measurement of moisture content, moisture content is in accordance with the revised parameters calculated to facilitate the users.

The instrument by Karl Fisher coulomb titration method, can reliably on liquid, gas and solid samples for trace moisture determination. When testing, for insoluble solid reagent and easy contamination of the electrode and reagent material can be equipped with corresponding solid, gas and liquid injector for indirect determination, is a kind of highly efficient, fully automatic analysis instrument. Widely used in electric power, petroleum, chemical, pharmaceutical, railway, environmental protection, scientific research institutions and other industries.

II. technical parameters

Drop formula: electric quantity titration (Coulomb analysis)

Range: 100mg ~ 0ug (10ug ~ 100ug)

Threshold: 0.1ug

Accuracy: 100ug + 3UG, 500ug + 3% (no error, environmental humidity error)

Test sample type: solid, liquid, gas

Display formula: 64K color high definition touch monitor

Data storage: 1000 test records

Dynamic curve, text display

Stir mixing speed: sliding touch panel speed control

Time period: ten years of normal operation of power down time

Printer: micro thermal printer, paper width 56mm

Power source: 220V 10V + AC, 50Hz + 2.5Hz

Work rate: 50VA

Using ambient temperature: 5 ~ 35

The use of environmental humidity: less than 85%

X 260mm X 220mm 330mm (length x width x height).

III. working principle

Calfee's reaction type with water:

$I_2+SO_2+3C_5H_5N+H_2O$ - HI+C5H5N - $2C_5H_5N$ - SO_3..... (1)

C_5H_5N SO_3CH_3OH -- C_5H_5N HSO_4CH_3..... (2)

The reagent solution is mixed with a mixture of sulfur dioxide, methanol, and so on. Iodine is formed by electrolysis on the anode, and all the iodine is generated, according to Faraday's law, which is proportional to the charge. The following formula:

2I2e -- I2..... (3)

By (1) type can be seen, the number of molecules in the reaction molar is equal to the number of water iodine. The samples were injected into the electrolyte, in a sample of water in the reaction, through the instrument can reflect the consumption of iodine in the process, and the consumption of iodine can be according to electrolysis to the same amount of iodine used electricity, calculated by the instrument, on the screen directly display the content of moisture of the test sample, the instrument by electrolytic current automatic control system, electrolytic current size can be automatically adjusted according to the size of the water content in the sample, the maximum up to 300 ma.

IV. structural features

One, the whole structure is shown in figure 1:

(1) cathode chamber drying tube

(2) the anode chamber drying pipe (two) is replaced by a 1 bending pipe (2), according to the user's needs

(3) measuring electrode

(4) Di Dingchi (anode chamber)

(5) electrolytic electrode

(6) sample injection port

(7) touch type color LCD

(8) power switch

(9) stir

(10) clip holder

(11) “TITR”　titration socket

(12) “DET” testing socket

(13) printer

(14) cooling fan

(15) fuse box

(16) power outlet

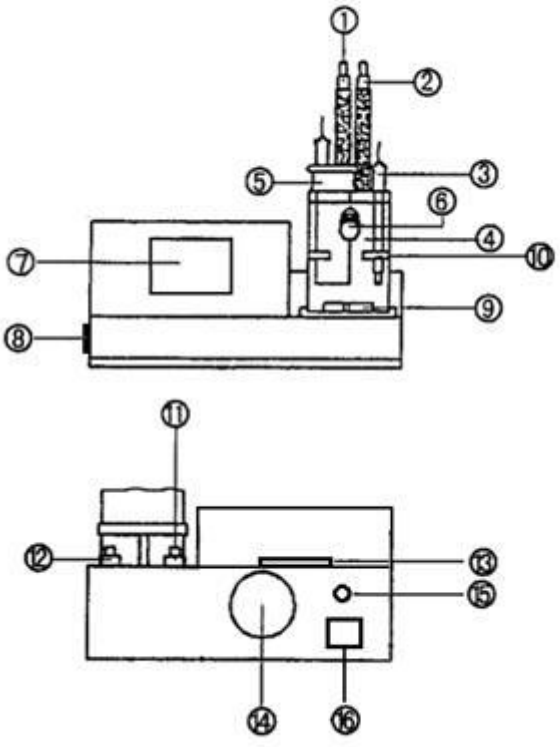


Figure 1

V. using method

One, The cleaning, drying and assembly of the titration tank:

1, before use, put the glass pool all open titration, titration pool, drying tube, sealing plug water cleaning. After cleaning the oven at about 80 C, then the natural cooling. Pay attention to the cathode chamber, a measuring electrode can not use water to clean and available acetone, methanol and other organic solvents for cleaning, after cleaning with a hair dryer. Cleaning should pay attention, do not clean to the electrode lead (see Figure 2), otherwise it will cause errors in the measurement of the sample process.

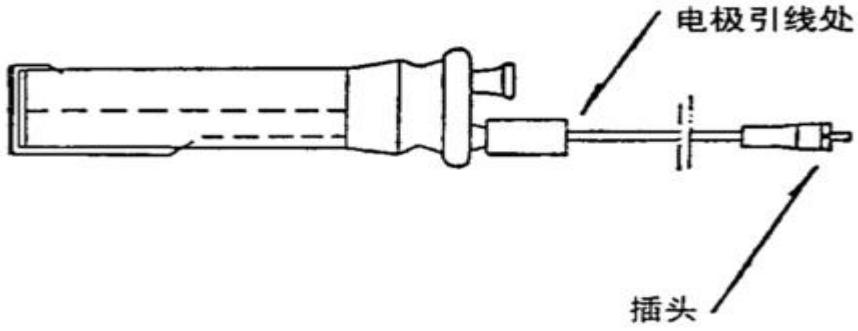


Figure 2

2, the silica gel into the drying tube, do not pay attention to the silica gel powder. Then the sample injection port plug installed (see Figure 3).

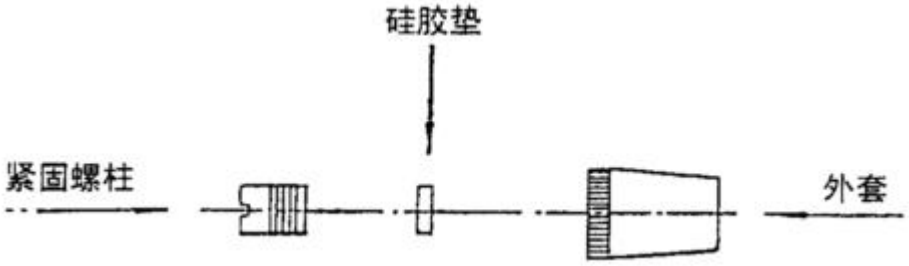


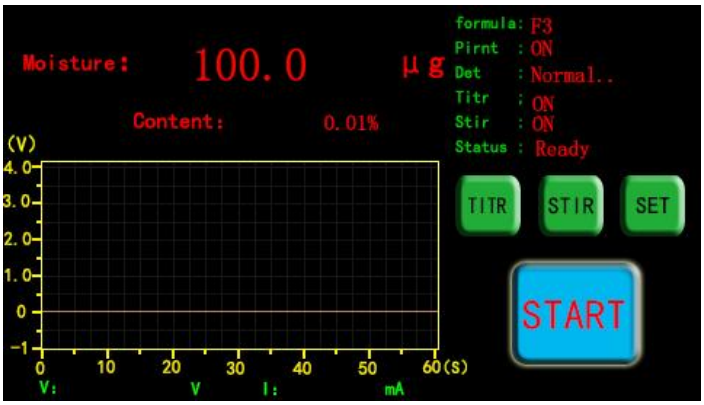
Figure 3

After the completion of the above operation, the mixing of the sample through the sample injection into the mouth. Then the measuring electrode, cathode electrode chamber, cathode chamber drying tube, inlet plug, sealing plug mill outlet, evenly coated with a layer of vacuum grease, in addition to the cathode chamber of the drying tube and sealing tube is not installed, other are installed to the corresponding parts, gently turning, and make it a better seal.

3, about 100 to 120 ml reagent a funnel (must be clean, dry) into anode chamber through a sealing mouth, then funnel to the cathode chamber reagent was injected, the liquid level of the cathode chamber and the anode chamber height should be consistent. Above after the completion of the operation the dry tube, a sealing plug is installed, gently turning, and make it a better seal (the operation should be in a fume hood). The measuring electrode and electrolytic electrode plug are respectively inserted into the measurement and electrolytic socket.

Two, operation interface function:

1, boot, the boot interface for several seconds after the instrument automatically enter the test interface:



For a switch to the electrolytic current or start and stop stirring, you can click on the "electrolysis" and "stir" button. Click "start", showing the "is" the state of the sample can be injected into the sample through injection, automatic titration instrument. Titration is finished, the measured moisture value and print the results. To change the calculation formula, click the "Settings" button to enter the setting menu interface (see next page).

The interface can be setting calculation formula, check test records, printer settings, set the delay time, and can adjust the titration pool stirrer stirring speed: slide to the right of the stirring speed adjustment of the slider can be adjustable high stirring speed, slide the slider to the left lower stirring speed (usually set the stirring speed is "4" file).

2. Setting interface (automatic liquid exchange function needs to be equipped with automatic liquid exchanger before it can be used)

(1) formula selection

The interface can be clicked to select the formula to confirm. Click the "formula parameter settings" button on the top right to enter the parameters of the selected formula. The interface parameters are used to explain the parameters used in the equation:

Formula 1:F1=DT/ (V*SG) ppm measurement results / (sample volume x)

The formula 2:F2=DT/ (W-w) ppm measurement results (sample / total weight - tare)

The measurement results of 3:F3=DT/W / ppm sample weight formula '

Formula F4=DT/ ppm (W/K) 4: measurement results / (sample weight / dilution coefficient)

Formula UG 5:F5=DT measurement results (measured moisture)

Among them, DT - measured water value, unit: ug;

V - sample sample sample volume, unit: ml;

SG - sample density, unit: g/ml;

W - sample weight, unit: mg;

W - tare, unit: mg;

W '- sample weight, unit: mg;

K dilution factor.

(2) test record

The interface for the test data record interface, you can view the test results before the test data record. Click on the "up", "down" up, down one by one look at the record. Click the "clear", the pop-up test record prompt box, if you click "OK" in the prompt box, you can

delete all data records.

(3) print settings

The interface can be set to enable or disable the printer. When enabled, the test is finished, the instrument automatically print test results; disable, do not print test results.

(4) delay setting

The interface can be set to click on the "start" after the time of the titration current, the unit for the second. If the delay time is 10 seconds, then click "start" for 10 seconds, then the titration current is switched on. This method is usually used in the determination of small water content samples.

Three, electrolyte balance and stability process:

1, turn on the power switch, after entering the test interface, the instrument automatically open the mixing and electrolysis. Titration pool within the mixing of speed in instrument factory has adjusted well, in general, no need to adjust, such as to adjust, enter the setup menu interface operation, mixing sub smooth rotation, to make the reagent splashed the wall of the pool shall prevail.

2, test interface at such as indicating the electrolyte iodine, show that electrolyte in electrolytic iodine excess state, appear this kind of circumstance, the sample was injected through the mouth into the amount of distilled water, until the instrument work voltage curve close to zero and reach equilibrium levels so far.

Four, instrument calibration:

When the instrument reaches the initial equilibrium point and is relatively stable, it can be calibrated with pure water. Specific operations are as follows:

1, with the 0.5ul 0.1ul sample to extract the pure water, for the calibration to prepare.

2, press the "start" button, then the water through sample plug into the anode chamber reagent. Note: the injector needle insertion to the reagent, tip to avoid and titration cell wall and electrode contact. After injection of pure water, the titration will start automatically.

3, buzzer, message "after the test", shows the results for 100 + 3UG (not including the in sample error), the general calibration 2 ~ 3 times, showing results in the error range can sample determination.

Five, determination of operation:

In the use of fresh reagent or in the determination of the sample process, the anode chamber of the reagent will naturally produce a small amount of iodine, the result will destroy the balance of the instrument. In this case, a small amount of water is extracted from the sample, and is injected into the anode chamber through the inlet. The instrument can be used to measure the operation until the instrument is re - restored to the equilibrium point.

With the calibration of the instrument similar, when the instrument to achieve equilibrium, baseline voltage is a near zero level line (equilibrium point) when, can sample test (in liquid samples, the content of formula F1 for example elaboration process):

1, sampling:

1ml syringe used for testing sample washing.

2, sample injection and determination

After the sampling, click the start button, the instrument display state is being titration, the sample is injected into the anode chamber through the inlet. The end of the titration, the buzzer, the state information prompt: Determination of end. The printer will print out the test results on the condition that is enabled.

As in the titration is not yet at the end to change the parameters calculation formula or formula used, in the titration end before click "Settings" - "formula to select" (- "parameter formula set") to complete.

VI. note

One, the attention of the reagent:

1, in the normal course of determination, every 100 ml of reagent can react with no less than 1 grams of water, if the determination of time is too long, the reagent sensitivity decreased, should be replaced by the new reagent.

2, the anode chamber reagent, if in the titration process found that release a lot of bubbles or reagent is pollution changong brown. At this time gap current will increase, the reproducibility of the titration can be reduced, but also to make at the end of the prolonged. This situation should be replaced as soon as possible reagent.

3, titration time more than half an hour, instrument is not stable, at this time, should according to electrolytic key stop mixing, observe whether the obvious Brown iodine in the lower part of the ceramic filter plate, if have no, or very little, should replace the reagent.

4, change the reagent to be careful, do not inhale or use hand contact with the reagents, such as contact with the skin, the application of water rinse.

Two, determination of the attention

1, when the sample is injected into the pool, the syringe needle should be inserted into the reagent. The sample should not be in contact with the inner wall of the titration cell and the electrode.

2, the typical measurement range of the instrument is 10 g ~ 100 g, in order to get accurate results, according to the sample water content to control the sample size.

3, must use the electrolyte of the original, in order to ensure the measurement accuracy.

VII. maintenance and maintenance

One, place of instruments:

1, the instrument shall not be placed in a corrosive gas indoors, the corrosive gas can make the circuit part of the instrument corrosion, shorten

Life of instrument.

2, the instrument should be placed at room temperature is higher than 5 and less than 40 or C or C place.

3, do not put the instrument in the direct sunlight and humidity of the place, the environment humidity should be no more than 65%.

4, do not install the device in the vicinity of the operating frequency of electrical equipment.

Two, reagent maintenance

1, the reagents are stored in well ventilated, ambient temperature in 5 or C to 25 or C relative humidity is not more than 65% of local, if the reagent is direct exposure to the sun or under high temperature under, sulfur dioxide and iodine will from pyridine released, resulting in failure reagent.

2, the toxicity of the reagent, smell and flammable must be very carefully, should be in a well ventilated test rig to load or replace the reagent.

Three, silicone pad replacement

The silicone pad of the sample is used for a long time to make a hole in the silicone pad without shrinkage, so that the water in the atmosphere into the titration pool and the error, this time should be replaced with silicone pad.

Four, silicone replacement

1, when the dry tube in the silica gel from blue to light blue, should be replaced by silica

gel.

2, the replacement should be careful not to put the silica gel powder into the dry tube, otherwise it will appear the following phenomenon:

(1) the reagent is discharged from the cathode chamber, and the cathode chamber is not a reagent and the electrolytic termination. (see Figure 4a)

(2) the anode chamber reagent enters the cathode chamber so that the iodine ion is aggregated and deposited on the ceramic plate, and the electrolytic efficiency (see Figure 4b) is reduced.

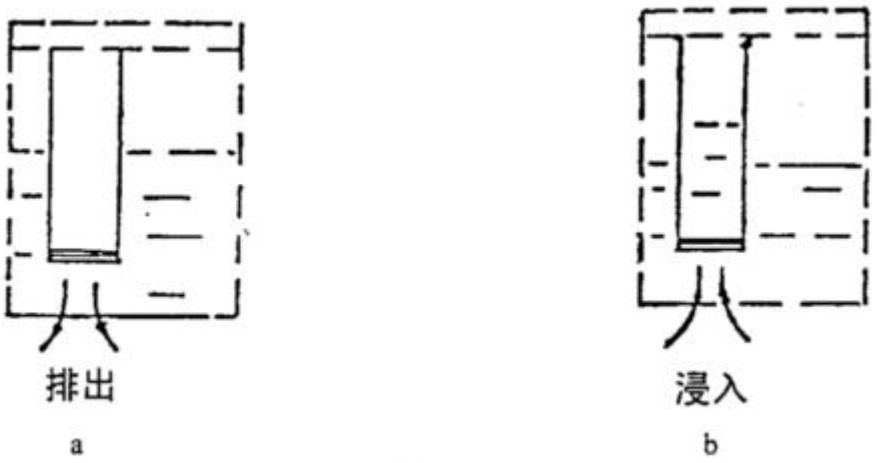


Figure 4

Five, The maintenance of the titration tank:

About a week to rotate about the titration cell grinding mouth of the junction, in can't easily turn should be re coated with thin a layer of vacuum grease (Note: vacuum grease coating should not be too much, otherwise the into the titration cell, resulting in measurement errors), if not checked, vacuum grease will harden and grinding mouth connecting the parts may do not tear down. So we should always maintain good, so that they are easy to disassemble and clean.

Six, The treatment of the connection of the titration tank:

If the junction of the junction of the titration tank is firmly fixed, it is not to be removed, and the pro

gram is removed:

1, the discharge of the reagent in the pool, and rinse.

2, in the mouth of the joint injection of a small amount of acetone, and then gently rotate the hand of the grinding parts, you can remove.

3, if still can not be disassembled, please put the titration cell in the 2 liter beaker, slowly added at the concentration of 5% potassium chloride solution soaking, the liquid level as shown in Figure 5 below, must pay attention to, don't let measuring electrode, a cathode

chamber electrode lead set end into the liquid, soak for about ten hours or 24 hours later, can be removed (this method can repeat).

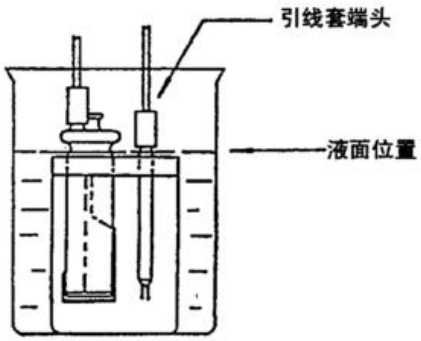


Figure 5

Seven, measurement of electrode maintenance:

1, when the magnetic force mixer to quickly stir, should pay attention to the mixing of the sub may beat and destroy the electrode.

2, when the measurement electrode into or out, should first turn off the motor, until after the stirring to stop rotating. Be careful not to make the measuring electrode touch the hole wall of the titration cell.

3, measuring electrode bending and no short circuit can be used. Can also be repaired. Repair with the root of the tweezers platinum electrode, slowly dressing platinum electrode tip, the available electrodes such as shown in Figure 6.

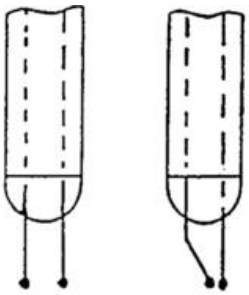


Figure 6

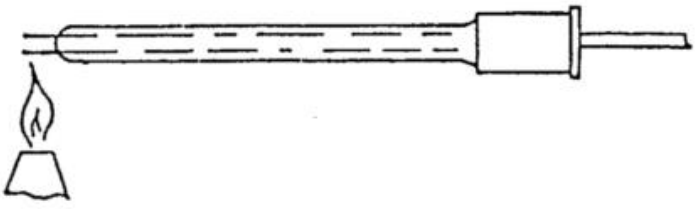


Figure 7

When the measuring electrode is contaminated, acetone are used for measuring electrode to wipe, if the dirt from the electrode still can not get rid of, please with the alcohol lamp flame was burning platinum pellet end (Figure 7) (please note the flame

slowly near the end of the platinum pellet, lest due to rapid heating caused part of the electrode glass burst).

When the measuring electrode leakage phenomenon of the inner electrode has obvious reagent (as shown in Figure 8), available million meter to measure electrode. If the measured resistance of more than 100k ohm, electrode can still be used. Otherwise, it shall be the replacement of the new electrode.

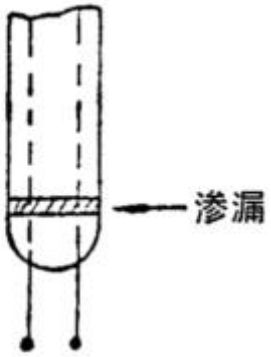


Figure 8

Eight, cathode room maintenance:

1, when the cathode chamber is to be removed, because the platinum wire and platinum wire is from the cathode chamber of the grinding port connecting part of the cross section, So should be careful not to touch the top of the titration tank and the hole wall (as shown in Figure 9).

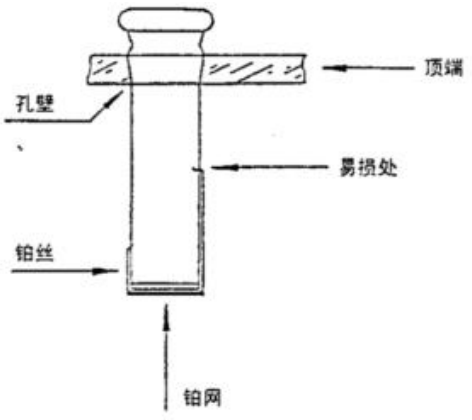


Figure 9

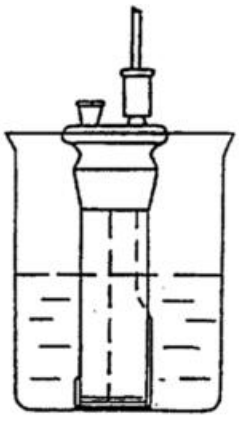


Figure 10

2, cathode chamber cleaning

The following phenomena may occur in the cathode chamber:

(1) reducing the electrolytic efficiency and prolonging the electrolysis time.

(2) because of the partial adherence of the contaminated water to the water, the blank current is increased.

(3) the titration speed is not stable, and can not reach the destination.

Such as the emergence of the acetone are used to clean glass looked and platinum online dirt (be careful not to touch the bad platinum and platinum net), the acetone is filled into the cathode chamber with rubber plugs or something similar sealed drying tube interface, fully shake to remove the dirt inside the (repeated). Then the acetone is poured out on the outer surface of the glass, but not flush to the lead wire. When can't clean, please cathode chamber immersed into with dilute sulfuric acid in the beaker (see Figure 10), be careful not to touch bad platinum and platinum net.

3, cathode chamber drying

The hot air drying of a fan, as shown in Figure 11, is difficult to dry. When it is possible to have the remaining water, the cathode chamber into the vacuum drying tube, dry for about 11 hours.

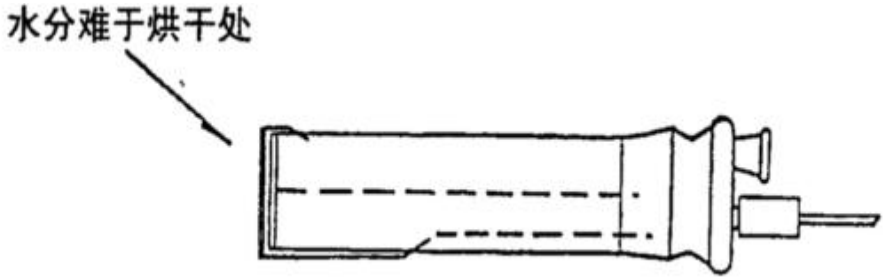


Figure 11