复制 Mizuno 教授实验
Reproduction of Professor Mizuno's experiment

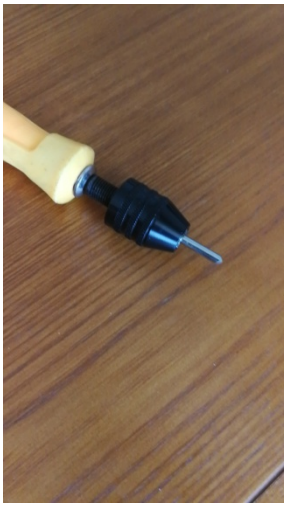
By 张航 H. Zhang

实践是检验真理的唯一标准
Practice is the sole criterion for testing truth
想，都是问题
Think, it's all a problem.
干，才有答案
Only by doing can we have an answer.
撸起袖子加油干
The nation remains mobilized for brand new endeavors.

我现在开始进行复制 Mizuno 教授实验，现场直播如下
Now I'm going to do the replication of Professor Mizuno's experiment. The live broadcast is as follows.
材料准备
stores reserve
钯棒
Palladium rod
直径 4mm 长 25mm 重 3.
4 mm in diameter, 25 mm in length and 3.6 g in weight

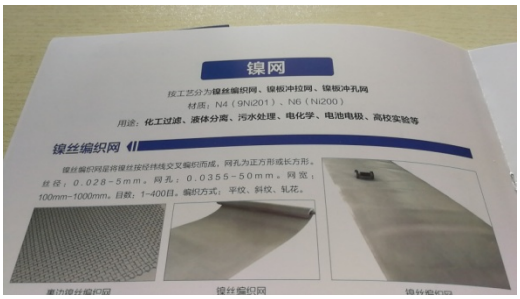
钯棒的夹具

Clamp for palladium rod



镍网，镍网是 180 目，纯度 N4，产于中国

Nickel mesh, nickel mesh 180 mesh, purity N4, produced in China

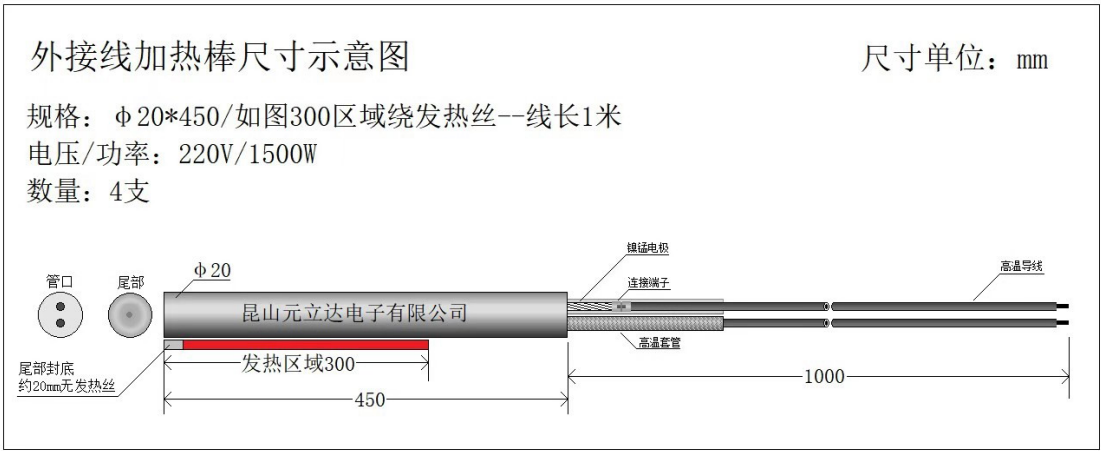


加热棒

Heating rod

直径 20mm，长 300mm，电压 220 伏，功率 1500 瓦

Diameter 20 mm, length 300 mm, voltage 220 V, power 1500 W



转换接头

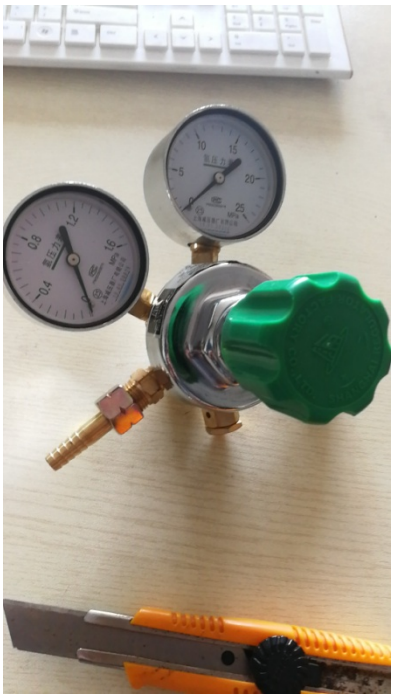
Transfer connector

12mm 转 16mm

12 mm to 16 mm

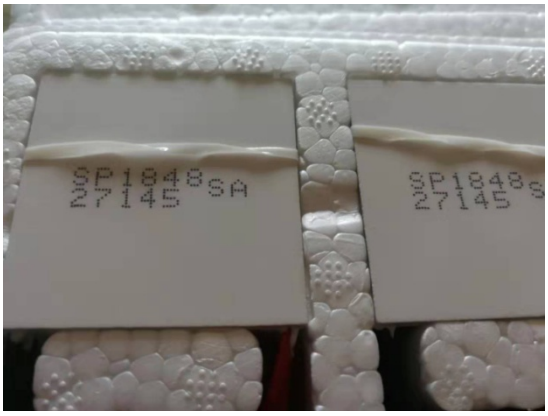
氢气减压阀

Hydrogen relief valve



赛贝克　元件

Seebeck element



水冷散热板

Water-cooled radiator

检测塞贝克元件

Detection of Seebeck Elements

塞贝克元件与水冷板组装

Seebeck Component and Water Cooling Plate Assembly

量热器内箱，长 800，宽 200，高 200

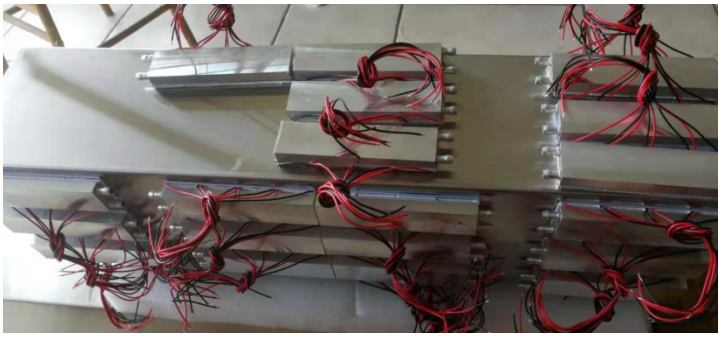
Calorimeter inner box, 800 long, 200 wide and 200 high

量热器外保温箱，长 1000，宽 400，高 400

Calorimeter external insulation box, 1000 long, 400 wide and 400 high

将塞贝克元件与水冷板组件安装在量热器内箱表面

Install Seebeck element and water-cooled plate assembly on the surface of calorimeter inner box



水冷板连接水管

Water Cooling Plate Connecting Pipe

塞贝克元件连接电线

Seebeck Element Connection Wire

量热器内安装容器支架

Installation of container bracket in calorimeter

量热器内安装风机

容器，直径 108，长 600

Containers, 108 in diameter and 600 in length

容器内的加热套管

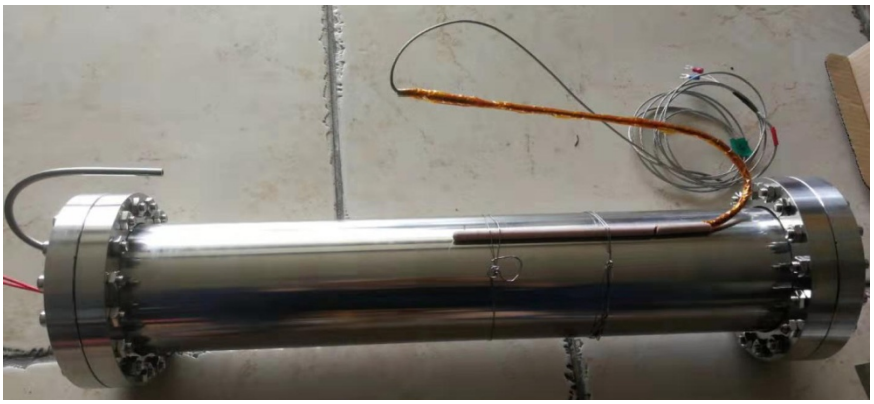
Heating sleeve in vessel

容器检测泄漏

Container Detection Leakage

给容器安装热电偶

Install thermocouples into containers

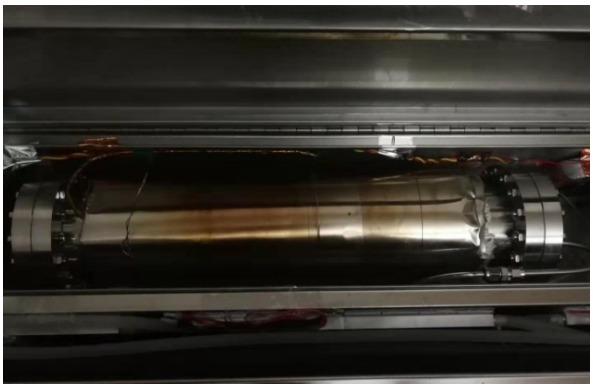


量热器组件放入保温箱

Calorimeter assembly put into incubator

给容器安装保温，并放入量热器

Install insulation for containers and put in calorimeter

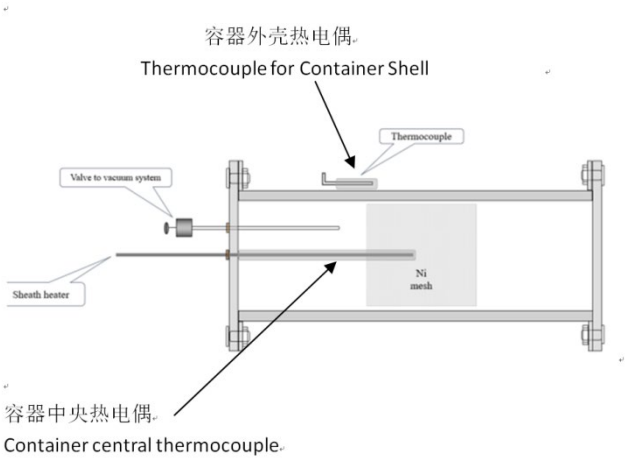


系统组装就位

System assembly in place

容器热电偶安装位置

Installation position of thermocouple in container



加热直流电源

Heating DC Power Supply

输出电压 0-220 伏，输出电流 0-10 安

Output voltage 0-220 V, output current 0-10 A

功率计

Power meter

用于测量加热电功率

Used to Measure Heating Electric Power

交流电稳压器

AC voltage stabilizer

用于稳定加热电源和风机电源的输入电压

Input Voltage for Stabilizing Heating Power Supply and Fan Power Supply

风机直流电源

DC power supply for fan

输出 0-30 伏，0-5 安

Output 0-30 V, 0-5 A

分子泵

Molecular pump

用于给容器抽真空，可以达到 0.001 帕

It can be used to vacuum the container up to 0.001 Pa.

在线数据记录仪

On-line Data Recorder

记录数据如下

Recorded data are as follows

量热器内温度 Temperature in calorimeter	冷却水出水温度 Cooling water outlet temperature	容器外壳温度 Container Shell Temperature	加热功率 heating power （W）	辉光放电电压 Glow discharge power(W)	环境温度 ambient temperature

容器压力 Vessel pressure （kpa）	塞贝克原件电压 seebeck Original voltage	冷却水进水温度 Cooling water inlet temperature	容器中心温度 Central temperature of container	风机的电流 Current of Fan	风机的电压 Voltage of Fan

恒温水槽

Thermostatic flume

用于提供 seebeck 元件冷却水，出水温度误差 0.01℃

It is used to provide cooling water for Seebeck components. The temperature error of effluent is 0.01 C.

空白试验

Blank test

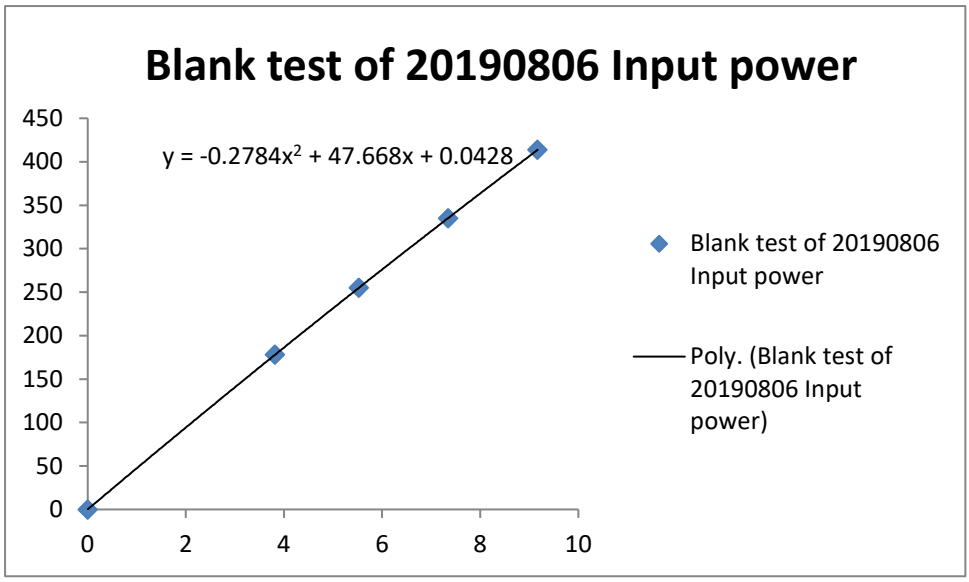
容器抽真空，进行空白试验

Vacuum evacuation of container for blank test

Blank test of 20190806			
Seebeck voltage	Input power	Calculated power	excess power
0	0	0.042	0.042
3.819	178.18	178.0009764	-0.179023558
5.529	255.09	255.0557242	-0.034275798
7.347	335	335.1940223	0.194022298
9.169	413.83	413.664924	-0.165075958

量热器内温度 Temperature in calorimeter	冷却水出水温度 Cooling water outlet temperature	容器中心温度 Central temperature of container	加热功率 heating power （W）	辉光放电电压 Glow discharge power(W)	环境温度 ambient temperature
41.6	33.6	322	164.2	0	27
49	36.9	351.9	241.2	0	26.7
56.9	40.5	404.9	321.3	0	27.3
64.7	43.9	450.1	400.2	0	27.5

容器压力 Vessel pressure （kpa）	塞贝克 seebeck 原件电压 Original voltage	冷却水进水温度 Cooling water inlet temperature	容器外壳温度 Container Shell Temperature	风机的电流 Current of Fan	风机的电压 Voltage of Fan
0	3.819	25.5	226.1	1.44	9.71
0	5.529	25.5	299.9	1.43	9.72
0	7.347	25.6	355.8	1.41	9.72
0	9.169	25.6	406.5	1.4	9.74



裁剪镍网，称重

Cutting nickel mesh and weighing

镍网尺寸 1000*200 mm，重量 56 克

Nickel mesh size 1000*200 mm, weight 56 g

镍网是 180 目

Nickel mesh is 180 meshes

用洗涤剂清洗镍网

Cleaning nickel mesh with detergent

砂纸打磨镍网

Sandpaper grinding nickel mesh

清洗镍网，并在 90℃去离子水中加热 1 小时

Clean nickel mesh and heat it in deionized water at 90℃ for 1 hour

用酒精清洗镍网

Cleaning Nickel Mesh with Alcohol

用钯棍摩擦镍网，钯棍减重 90 毫克

Rubbing nickel mesh with palladium rod, palladium rod reduces weight by 90 mg

将预处理好的镍网装入容器。

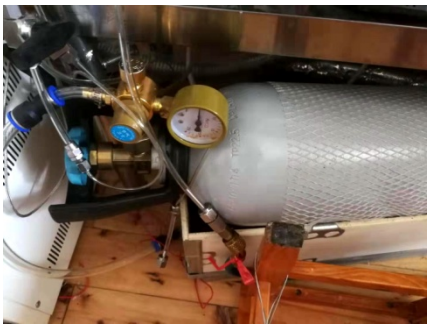
The pretreated nickel mesh is loaded into the container.

氘气瓶和减压阀

Deuterium cylinder and pressure relief valve

氩气瓶和减压阀

Argon cylinder and pressure relief valve



容器加热至 200 度以上，维持 4 小时

Vessel heated to over 200 degrees for 4 hours

容器抽真空至 0.001 帕，维持 4 小时

Vacuum the container to 0.001 Pa for 4 hours.

冷却容器 2 小时

Cooling container for 2 hours

充入氘气

Filling Deuterium

调整气压至 100 帕

Adjust air pressure to 100 Pa

开始加热

Start heating

D2 test of 20190809			
Seebeck voltage	Input power	Calculated power	excess power
0	0	0.042	0.042
1.939	91.37	91.40953756	0.039537562
3.845	178.19	179.1847411	0.99474105
5.558	255.99	256.3484808	0.358480808
7.317	335.11	333.8865201	-1.223479942

时间 time	量热器内温度 Temperature in calorimeter	冷却水出水温度 Cooling water outlet temperature	容器中心温度 Central temperature of container	加热功率 heating power （W）
2019-08-10 00:12:00	33.3	29.8	228.3	77.3
2019-08-10 06:22:00	41.7	33.6	323	164.2
2019-08-10 11:45:00	49.1	36.9	377.3	242.1
2019-08-10 15:31:00	56.7	40.3	411.2	321.3

环境温度 ambient temperature	容器压力 Vessel pressure （kpa）	塞贝克 seebeck 原件电压 Original voltage	冷却水进水温度 Cooling water inlet temperature	容器外壳温度 Container Shell Temperature	风机的电流 Current of Fan	风机的电压 Voltage of Fan
26.6	0	1.939	25.5	128.5	1.45	9.71
26.2	0	3.845	25.5	226.3	1.44	9.72
26.9	0	5.558	25.6	299.3	1.43	9.72
26.8	0	7.317	25.6	362.1	1.42	9.73

由上表可以看出，没有明显多余热量，数据与空白试验吻合。

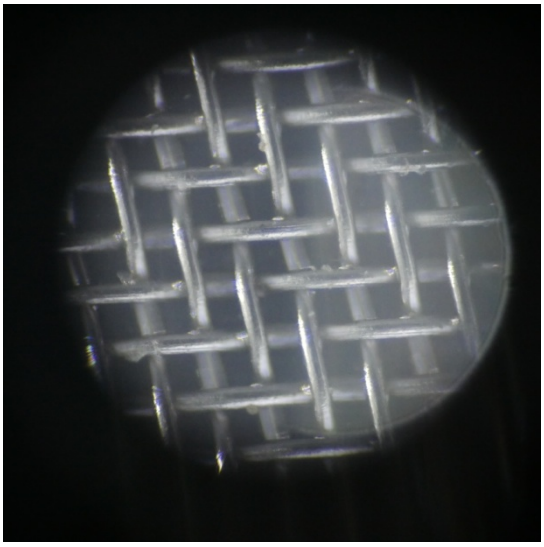
As can be seen from the table above, there is no obvious excess heat, and the data are consistent with the blank test.

下面开始抽真空，充氘气，再来一遍

Let's start vacuum, fill deuterium, and do it again.

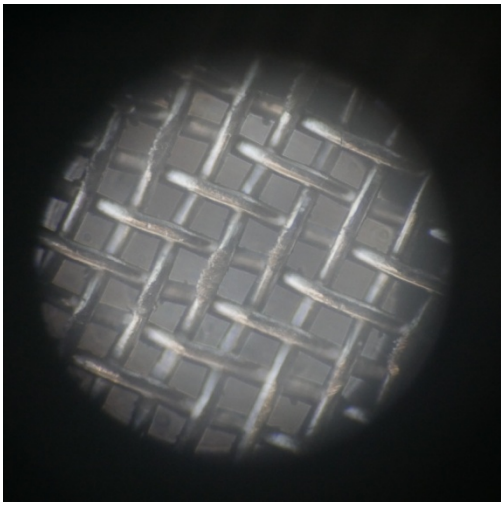
这是原始镍网的照片

This is a picture of the original nickel net.



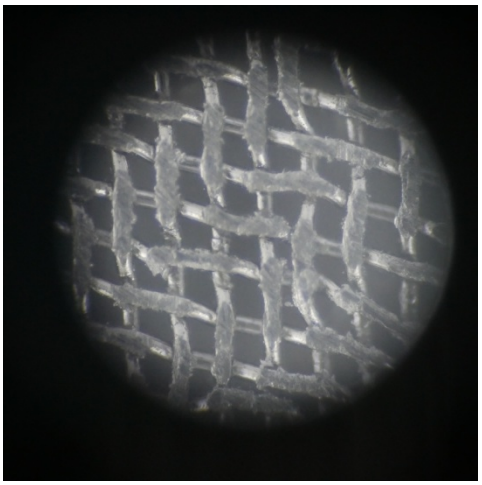
这是清洗、打磨、摩擦钯一遍、的镍网

This is a nickel net for cleaning, polishing, rubbing palladium once and for all.



这是清洗、打磨、摩擦钯两遍、的镍网

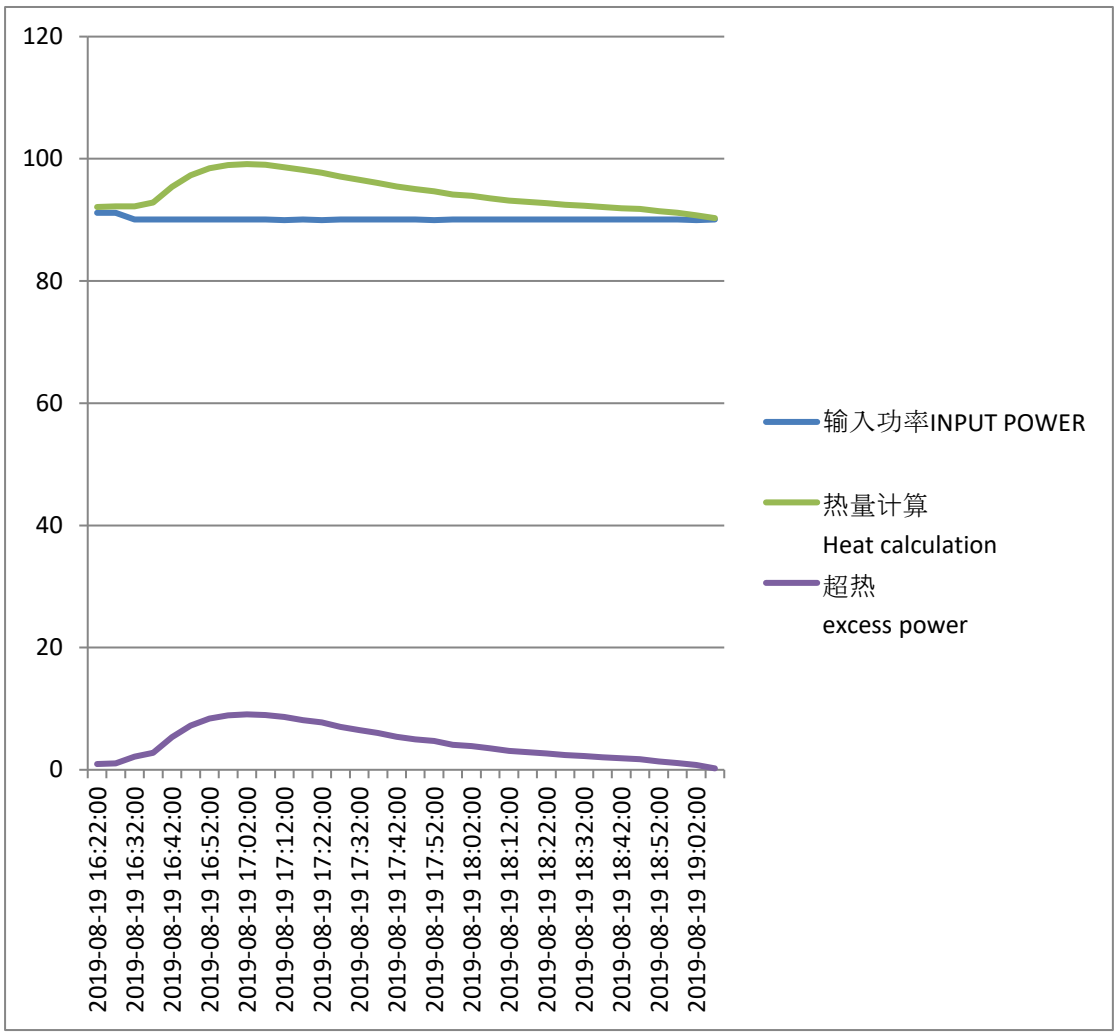
This is a nickel net for cleaning, polishing and rubbing palladium twice.



几次短时间的多余热量
Several short-term excess heat
将容器加热至 100 度以上
Heating the container to over 100 degrees
抽真空
Vacuum extraction
冷却至常温
Cooling to room temperature
充氘气 1.5 毫升 0.3MPa
Deuterium-filled gas 1.5 ml 0.3 MPa
放置 24 小时
Place for 24 hours
77 瓦加热
77 W Heating
热平衡后抽真空
Vacuum extraction after heat balance
充氘气 1.5 毫升 0.3MPa
Deuterium-filled gas 1.5 ml 0.3 MPa
这时可以看见 2 小时以上的最高 9 瓦的多余热量
At this point, you can see more than 9 watts of excess heat in more than 2 hour.
当多余热量消失后
When the excess heat disappears
抽真空
Vacuum extraction
充氘气 1.5 毫升 0.3MPa
Deuterium-filled gas 1.5 ml 0.3 MPa
现象可以重复
Phenomena can be repeated

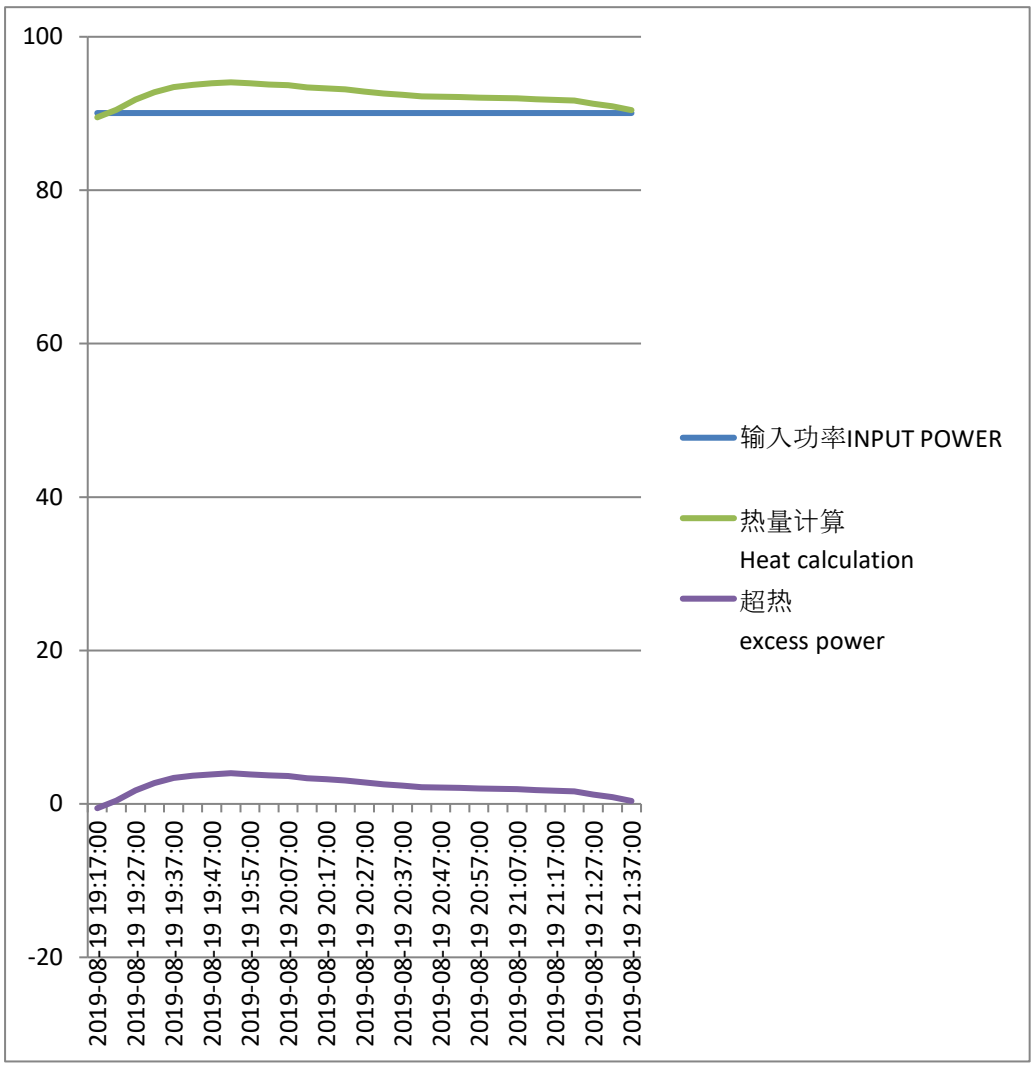
第一次，持续时间 2.5 小时，最大多余功率 9 瓦，总热量 44 千焦

For the first time, it lasts 2.5 hours, with a maximum excess power of 9 watts and a total heat of 44 kJ.



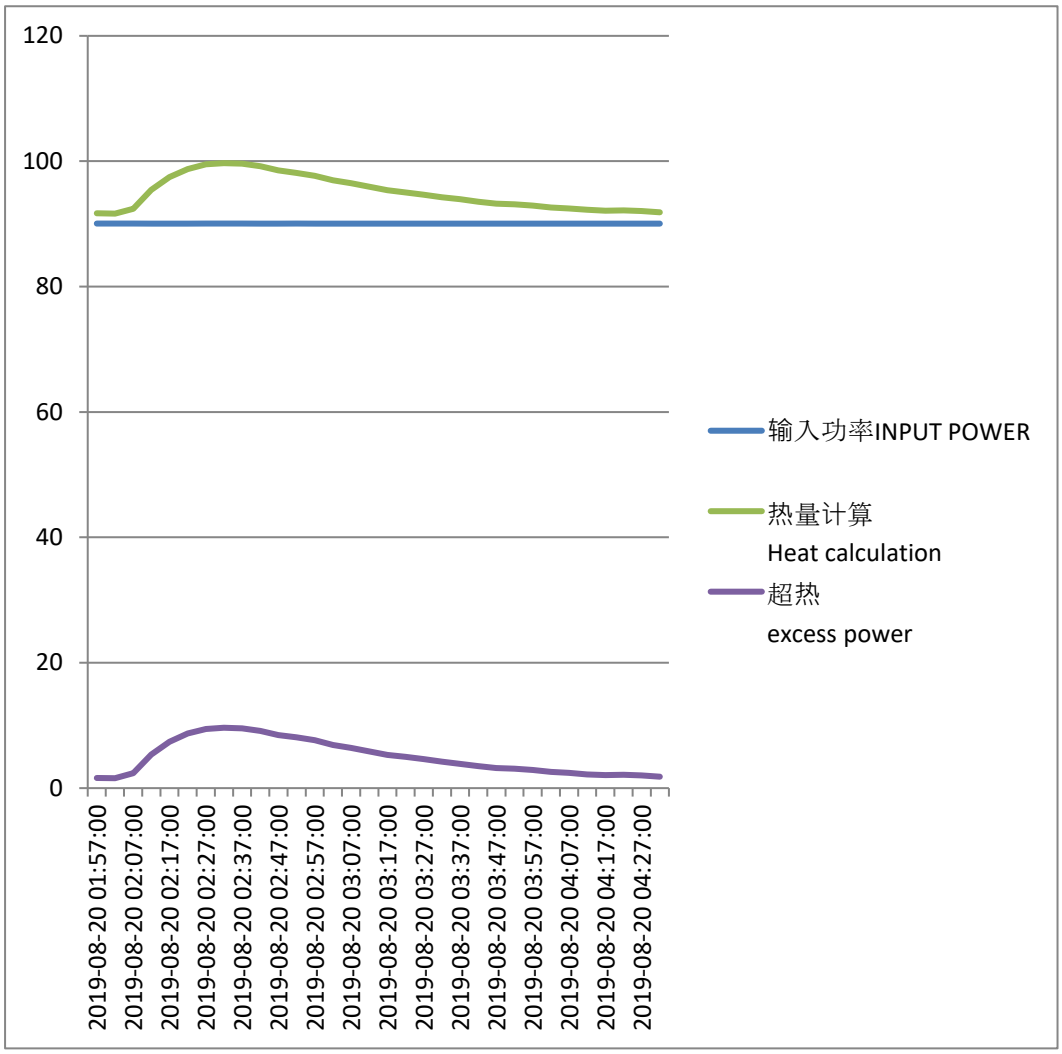
第二次，持续时间 2.5 小时，最大多余功率 4 瓦，总热量 20 千焦

The second time, lasting 2.5 hours, maximum excess power 4 watts, total heat 20 kJ



第三次，持续时间 2.5 小时，最大多余功率 9.6 瓦，总热量 47 千焦

Third time, duration 2.5 hours, maximum excess power 9.6 watts, total heat 47 kJ



充入的氘气 1.5 毫升 0.3MPa，约 0.0002 摩尔，化学能约 60 焦耳，测到的多余热量远远大于化学能。

The added deuterium gas is 1.5 ml 0.3 MPa, about 0.0002 mole, and the chemical energy is about 60 joules. The measured excess heat is much larger than the chemical energy.

同样情况下，将容器抽真空，充入 1.5 毫升 0.3MPa 氩气，未观察到多余热量

Similarly, the container was vacuum-pumped and filled with 1.5 ml 0.3 MPa argon. No excess heat was observed.

欲知后事如何，且听下文分解

If you want to know what's going on, listen and break it down.