Chapter 1 Safety Information

Introduction

The guides provided with your analytical instrument contain information and warnings that you must follow to ensure safe operation and to maintain the instrument in a safe condition.This advice is intended to supplement,not supersede,the normal safety code of behavior prevailing in the country of operation.

General safety practices for atomic spectroscopy and potential hazards with various atomic absorption techniques are described in the *User's Guide* for the atomic absorption spectrometer.Please refer to that guide before you operate the system.

The information provided does not cover every safety procedure that should be practiced.Ultimately,maintenance of a safe laboratory environment is the responsibility of the user and the user's organization.

Correct use of analytical instruments

Before you install or use your instrument,and in order to get the best results,you should be familiar with all of the instruments in the system and know how to operate them.You should also be aware of the safety procedures in force in your laboratory,especially those concerning atomic spectroscopy instruments.Read the guides supplied with the instruments before you start.

If you use the instrument in a manner not specified in the guides,or if you use it for a purpose other than that intended,you man damage the instrument,or compromise your own,or someone else's,safety.

Analytical instruments should only be operated by persons who are suitably qualified and have received adequate training.

Warning Messages

1. Only a Jingke service engineer or similarly trained and authorized person should be permitted to service the instrument. Do not attempt to make adjustments,replacements,repairs,or modifications to this instrument except as described in the documentation supplied with the instrument.
2. Be sure there is no fire in the laboratory in where the instrument locate and the atomic absorption spectrophotometer and acetylene cylinder can not locate in the same room
3. Because high power 220V power supply,water and air are needed when the 6810GF starts to work.please do not go away from the machine when you start.

Chapter 2 Overview

Atomic absorption graphite furnace control system full controlled by PC is used for atomic absorption analysis without flame heating.It is composed of graphite furnace power controller and graphite furnace device(named graphite furnace atomic device) which is installed in the combustion chamber of the atomic absorption spectrophotometer.

There are 20 programs,parameters such as temperature,time, opening or cutting off internal and external protective gas can be presetted,easy to operate

There are 3 flow setting functions to the internal gas,the user can select any one according to need.
High-power heating function make the operation is reliable.The graphite tube easy to install and dismantle,can quickly aim at optical axis,easy to use,has stable performance.

Graphite furnace system can be used accompanied with the atomic absorption spectrophotometer produced by our factory.

Chapter 3 Installing

Environmental Requirement

Obvious vibration, strong magnetic field, corrosive gas and dust are not permitted.The room temperature is 10℃～30℃, relative humidity＜85%. In addition, the work bench should be flat, firm and an air exhaust device should be installed on the above of the graphite furnace(please refer to ***the User's Guide for the atomic absorption spectrophotometer***).

About Power Supply, Air Supply and Waterhead

The laboratory should provide:

1.Power supply: 220V±22V 30A 50Hz alternating current power supply
2.Good and separate grounding lines

Graphite furnace heating needs high power, therefore this power must be pulled out separately from the power which total capacity is 20KW,the sectional area should not be less than 4mm^2.For preventing the interference influencing the host machine and PC,oo not connect any other devices including the atomic absorption spectrophotometer and PC.

The user should prepare an argon steel cylinder(purity＞99.99%),put it on an appropriate place.

The waterhead is ordinary clean tap water connected with the inlet and outlet of the graphite furnace,the water flow should be more than 2L/min.

Out Of Box Audit

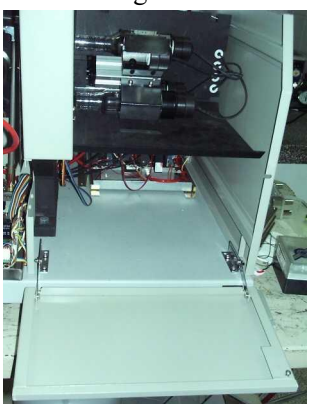
Open the box,take out the spare parts list and check one by one. Dismantle packaging bag,put the instrument on a work bench and check if there is any damage.

Installing

Installing furnace and controller

1. Confirm the host machine(atomic absorption spectrophotometer) does not working.
2. Open the cover of lamphouse(Figure 2-1)

Figure 2-2



3. Open the panel of the chamber at the bottom right (Figure 2-2)
4. Take out the right little spile (Figure 2-3)

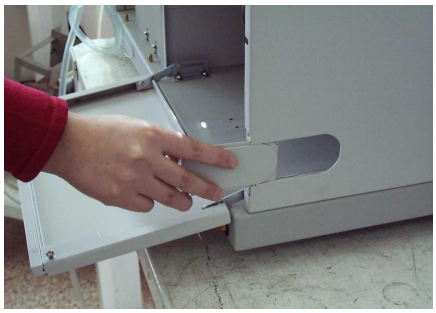


Figure 2-3

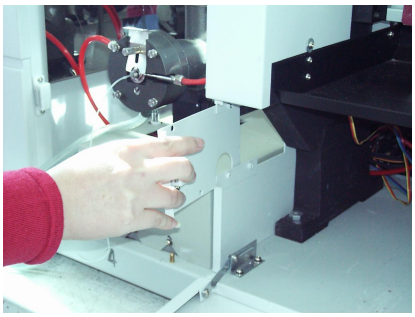


Figure 2-4

5. Take down the little spile on the right of the sample room (Figure 2-4)
6. Put the controller on the right of the host machine (Figure 2-5)

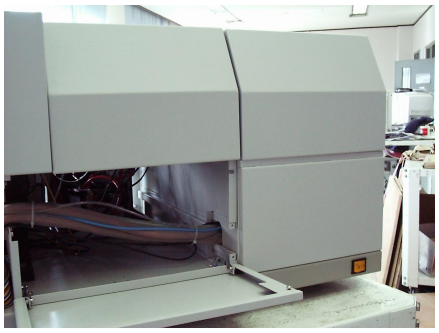
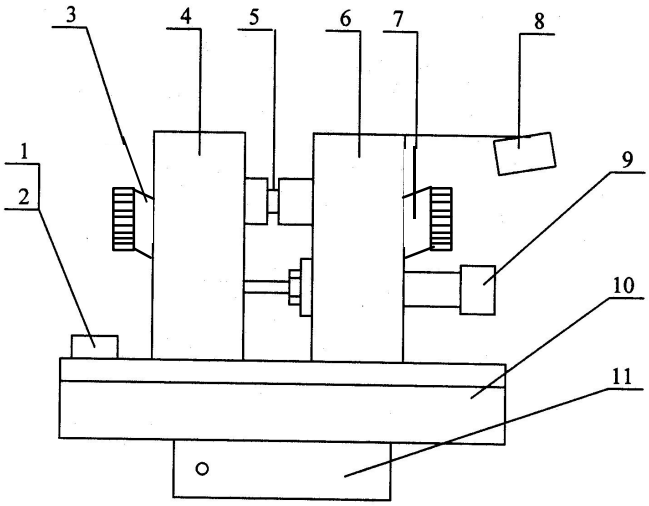


Figure 2-5

Figure 2-6

7. Put the furnace into the chamber on the bottom right of the host machine (Figure 2-6)
8. Recover the panel on the bottom right of the host machine
9. Close the cover of the lamphouse



1. swing lock part（front） 2. swing regulating part（back） 3. lens cone（left）

4. electrode base（left） 5. graphite tube 6. electrode base（right）

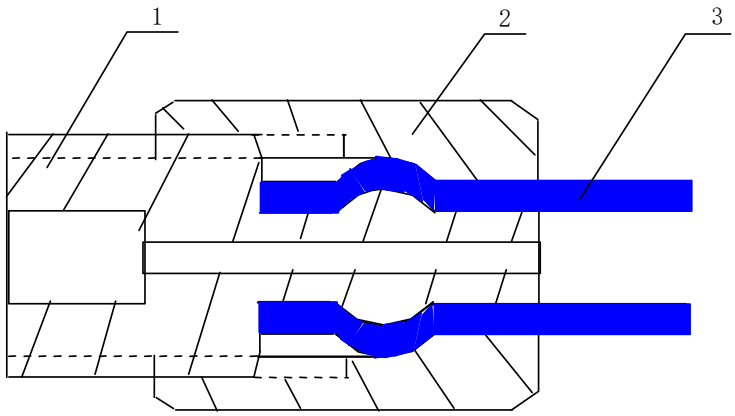
7. lens cone（right） 8. temperature detector 9. compression pump

10. foundation 11.installing base

Figure 2-7 Graphite Furnace

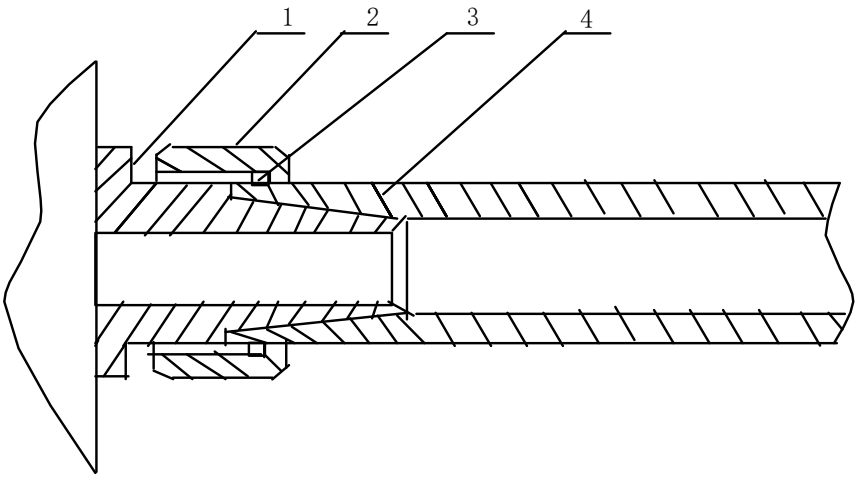
Installing the air supply and waterhead

1. Open the accessories box,install the oxygen reducing valve on the argon steel cylinder, dismantle output connector on the oxygen reducing valve,replace it with the connector in the accessories(HPSF8.470.832)
2. Take out the plastic tube(07-01-804I) from the accessories,cut out an appropriate section according to the actual distance from the argon steel cylinder to graphite furnace power controller,connect the plastic tube with the connector on the steel cylinder going through the nut (HPSF8.940.821)and tighten it.Then connect the other end with the air supply port on the back of the power controller(see the Figure 2-8)
3. Take out the PVC tube(07-01-609) from the accessories,cut out two appropriate sections according to the distance from the waterhead or drain-pipe to water inlet or water outlet on the back of the graphite furnace controller.Connect one end of one section with the tap water tap(it must be subulate laboratorial tap),the other end with the cooling water inlet of the furnace;connect one end of the other section with the tap water tap(The orifice must aim at sewer of the fountain avoid to spatter),the other end with the cooling water outlet of the furnace,see the Figure 2-9



1.air port 2. nut 3. plastic tube

Figure 2-8 Schematic diagram for connecting air port



1. cooling water port
2. thread bushing (HPSF8.470.198)
3. clamping ring (HPSF8.950.077)
4. PVC tube (07-01-609)

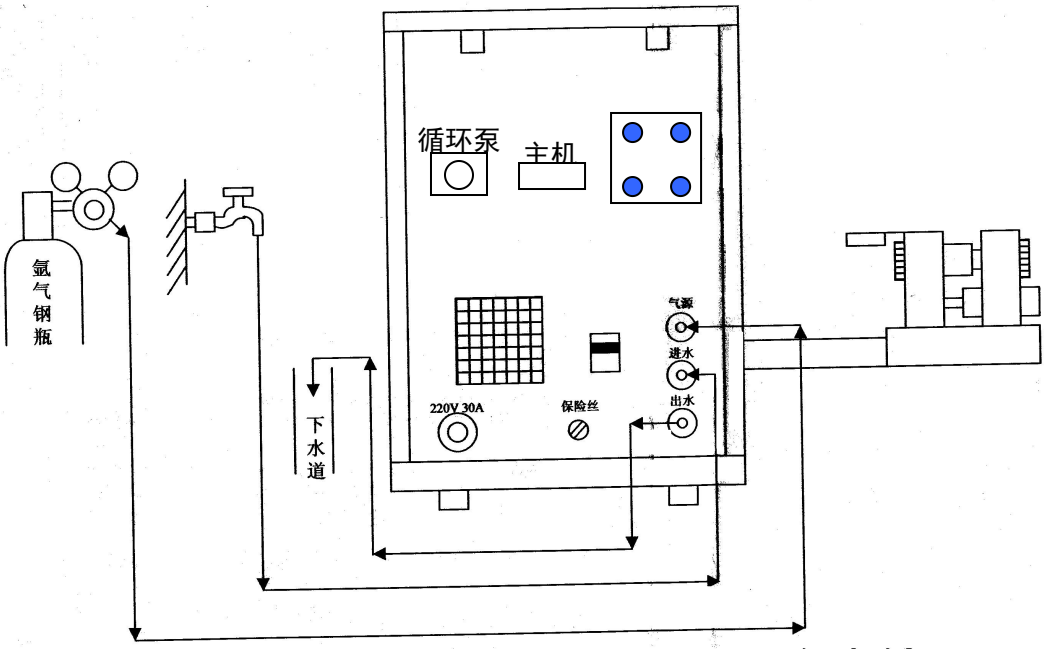


Figure 2-9 Schematic diagram for connecting cooling water port

Connecting power lines and control lines

1. Plug the 220V power lines on the back of the controller into the 220V patch board.
2. Take out RS232 communication lines from accessories,connect the RS232 interface on the back of the host machine of the graphite furnace with the RS232 interface of the graphite furnace.

Figure 2-10 Schematic diagram for connecting graphite furnace power controller

Installing the graphite furnace when the flame changing into the graphite furnace

1. Ensure the host machine and the graphite furnace cnotroller both are not in working
2. Close acetylene and air supply
3. Take out of the fan cover on the combustor(Figure 2-11)

Figure 2-11

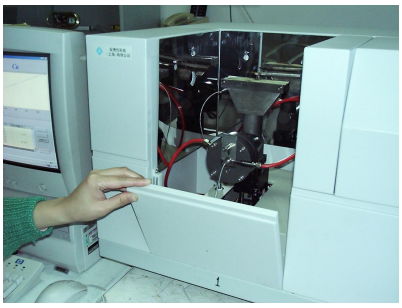


Figure 2-12

4. If there is a front panel on the combustor,take out of it (Figure 2-12)
5. Take out burner of the premixer(Figure 2-13)

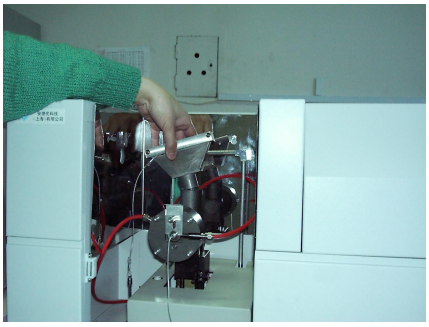


Figure 2-13

Notice: the burner must has been cooled!

6. Loosen the set screw at the back of the premixer and dismantle the premixer (Figure 2-14)

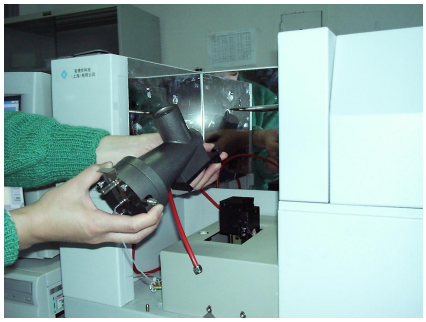


Figure 2-14

Figure 2-15

7. Put the premixer on an appropiate place on the bottom left of the combustor (Figure 2-15)
8. Open the cover of the lamphouse (Figure 2-16)

Figure 2-16

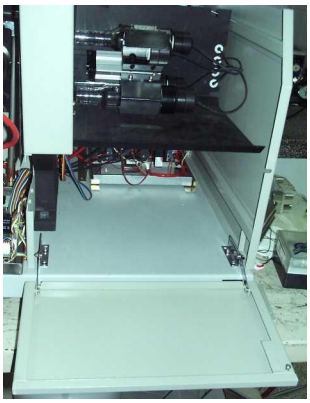


Figure 2-17

9. Open the panel on the bottom right of the host machine (Figure 2-17)
10. Take out the graphite furnace of the bottom right chamber of the host machine (Figure 2-18)

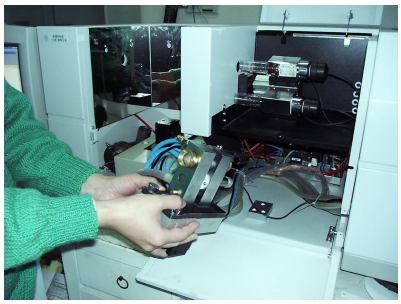


Figure 2-18

Figure 2-19

11. Install the graphite furnace on the lift platform of the combustor and tighten the set screw (Figure 2-19)
12. Close the panel on the bottom right of the host machine
13. Close the cover of the lamphouse

Installing the burner when the graphite furnace changing into the flame

1.Ensure the host machine and the graphite furnace cnotroller both are not in working
2.Close air supply and waterhead
3.Pull open the left furnace body left toward(Figure 2-20),take out the graphite tube(Notice:the furnace body and graphite tube must have been cooled)

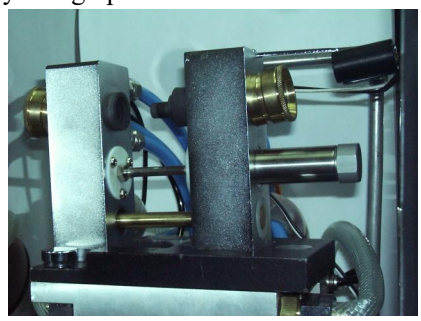


Figure 2-20

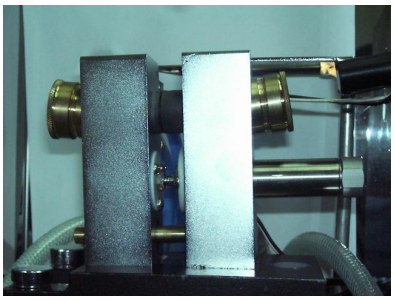


Figure 2-21

4.Close the left furnace body (Figure 2-21)
5. Open the cover of the lamphouse (Figure 2-22)

Figure 2-22

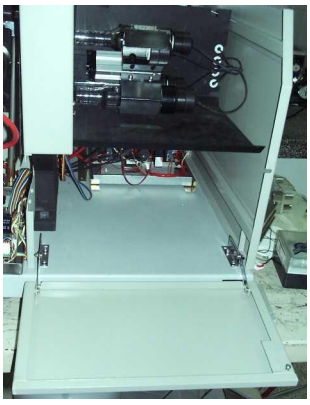


Figure 2-23

6. Open the panel on the bottom right of the host machine (Figure 2-23)
7.Loosen the set screw

Figure 2-24

8.Carefully take out the graphite furnace body and put it in the bottom right chamber of the host machine

9. Close the panel on the bottom right of the host machine

10. Close the cover of the lamphouse

11. Take out the premixer of the bottome left chamber of the combustor and put it on the lift platform (Figure 2-25)

Figure 2-25

Figure 2-26

12. Tighten the set screw at the back of the premixer (Figure 2-26)

13.Install the burner(Figure 2-27)

14. The drain system is installed and operating correctly.

15.Install the mesh enclosure on the combustor before igniting

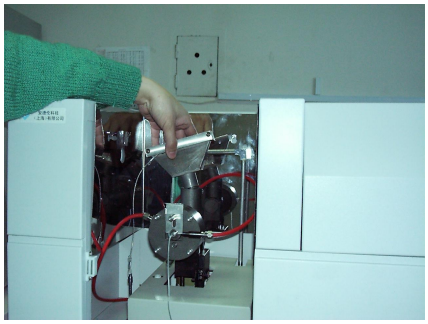


Figure 2-27

Adjusting the graphite furnace body

1. Turn on the power switch of the host machine
2. Turn on the power switch of the PC
3. Turn on the power switch of the graphite furnace controller
4. After the initialization open the interface of “Furnace Parameters Editor” (Figure 2-28a)

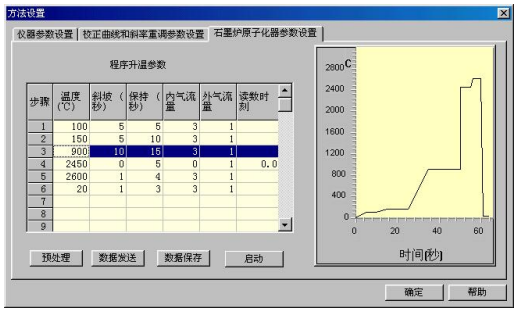


Figure 2-28a

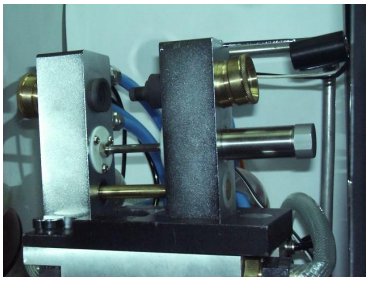
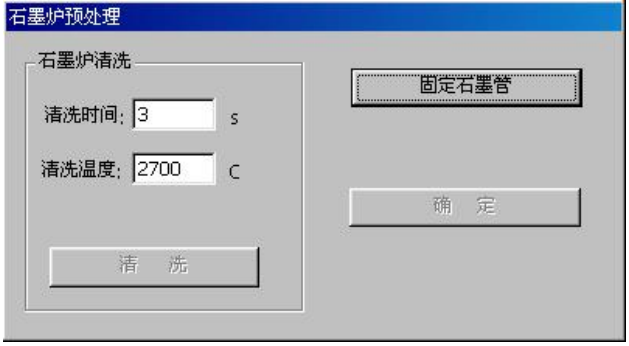


Figure 2-29



5. Select the “Furnace Control”
6. Press the “Furnace Control”,”Furnace Control” dialog box pops up(Figure 2-28b),set clean time and clean temperature according to the actual requirements of the user’s.The range of the clean time is 0～10,the range of the clean temperature is 1000～3000.

Figure 2-28b

7. Select the “Open tube”
8. Pull open the left part of the graphite furnace with hand,put into graphite tube, position graphite tube with keeper and close the left furnace (Figure 2-29)
9. Select the “Close tube”
10. Back to the ”Furnace Control” window,select the “Set lift platform”(Figure 2-30)

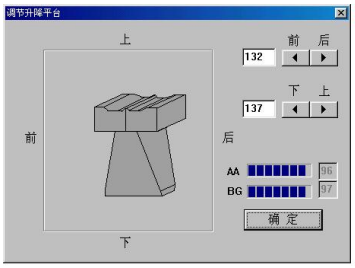
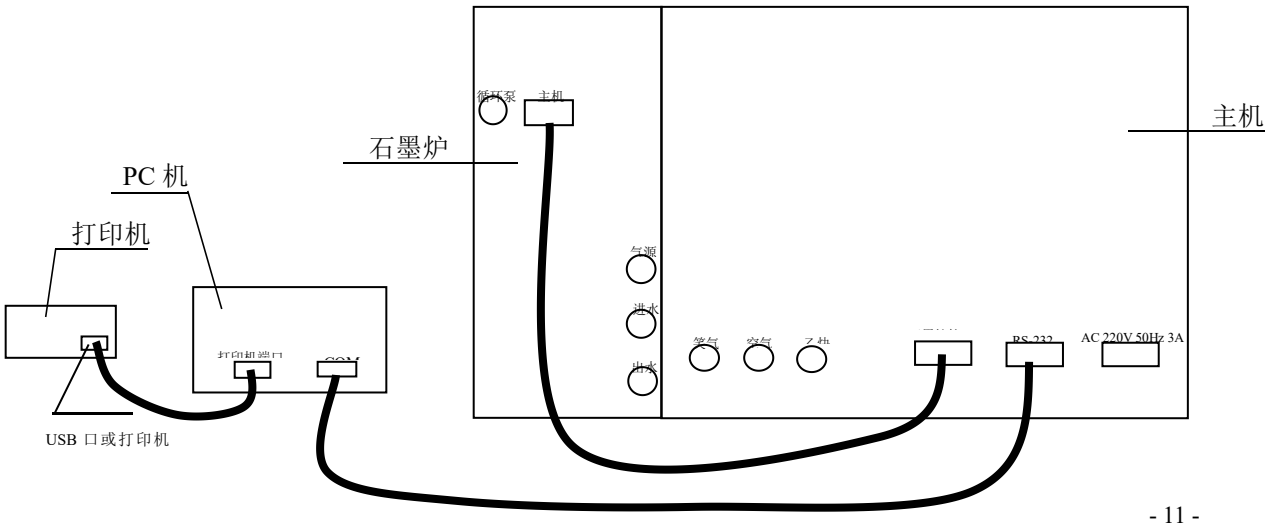


Figure 2-30 Figure 2-31

11. Adjust the [▲][▼][►][◄] and the swing regulating part of the furnace or input the coordinate value to make the light emitting from the hollow cathode lamp accurately and effectively go through the graphite furnace (get the maximum energy)
12. Screw the swing lock part(Figure 2-31)
13. Close the panel on the bottom right of the host machine
14. Close the cover of the lamphouse

Installing the Workstation Hardware

Installing the Hardware



Schematic Diagram for connecting lines of host machine,graphite furnace,printer and PC (back)

Connecting the power supply

Installing the connecting lines of host machine,PC and graphite furnace

Connect one end of the cable with the serial port of the graphite furnace,the other end with the RS232 port of the host machine.

WARNING All the connection on the hardware and installation must be done without power otherwise corresponding components may be damaged.

Chapter 4 Software Guide

Switching on the system

1.Start the Computer

2.Click on “AAS”icon twice,open the workstation,it starts self-test (Figure 4-2)

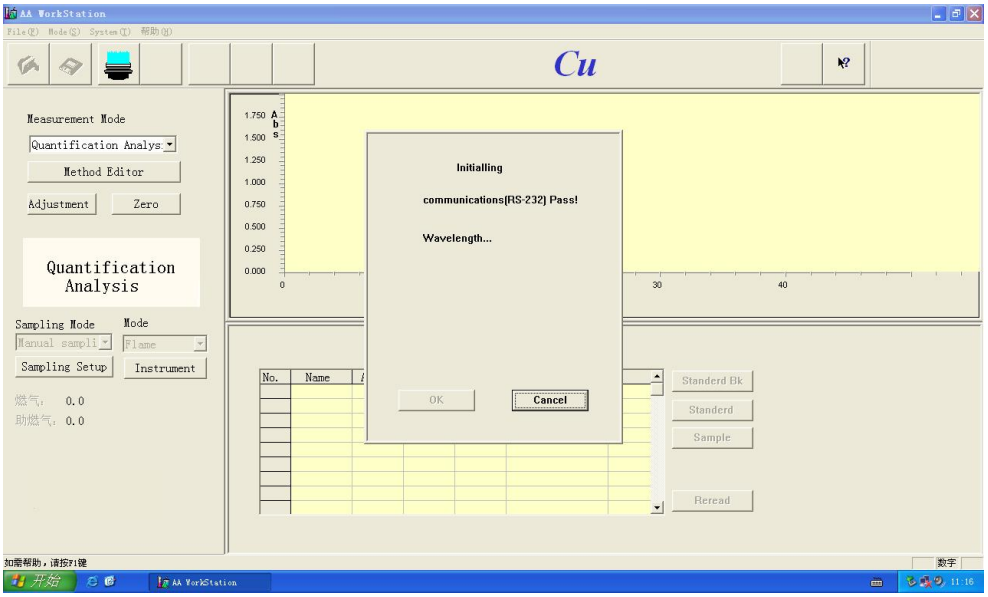


Figure 4-2

NOTICE If you need to see stored measurement result in the offline state, then click on the cancel button after starting workstation, close the self-test dialog box, then you can use the data file.

If you want to host online again, restart your workstation.

3. after the self-test the following is shown in Figure 4-3.

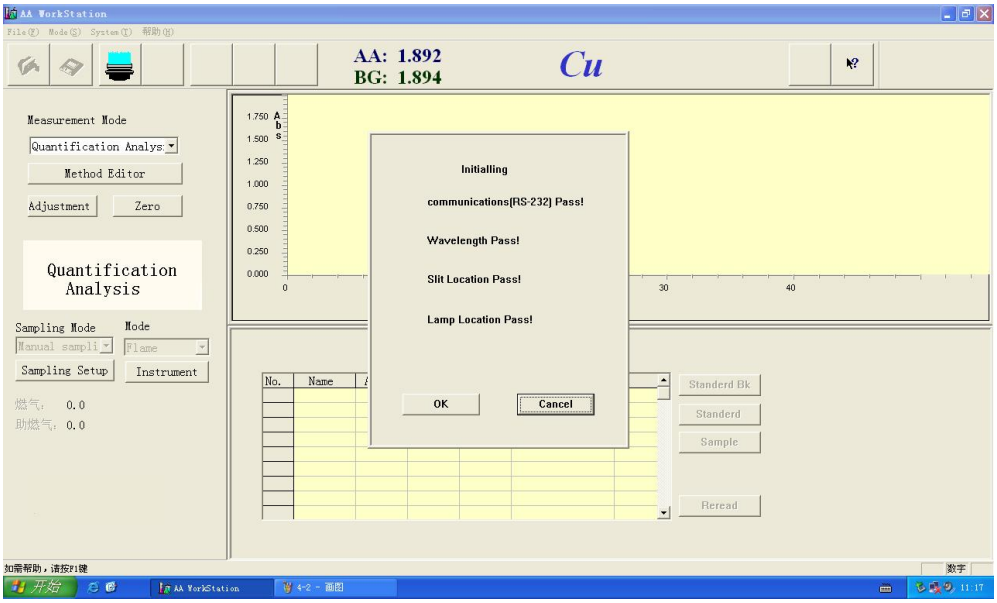


Figure 4-3

4. Click on 【OK】 button, the following is shown in Figure 4-5.

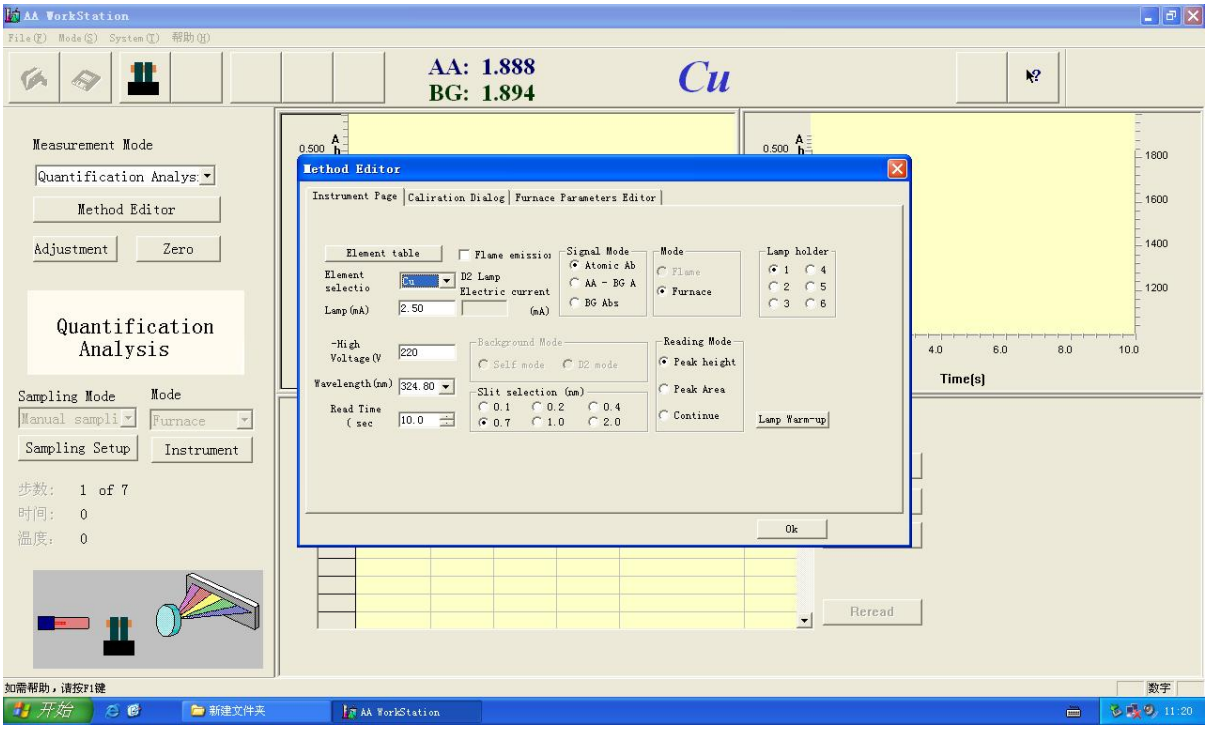


Figure 4-5

The user can select corresponding testing condition and method according to their own requirements.

Introduction of the application window

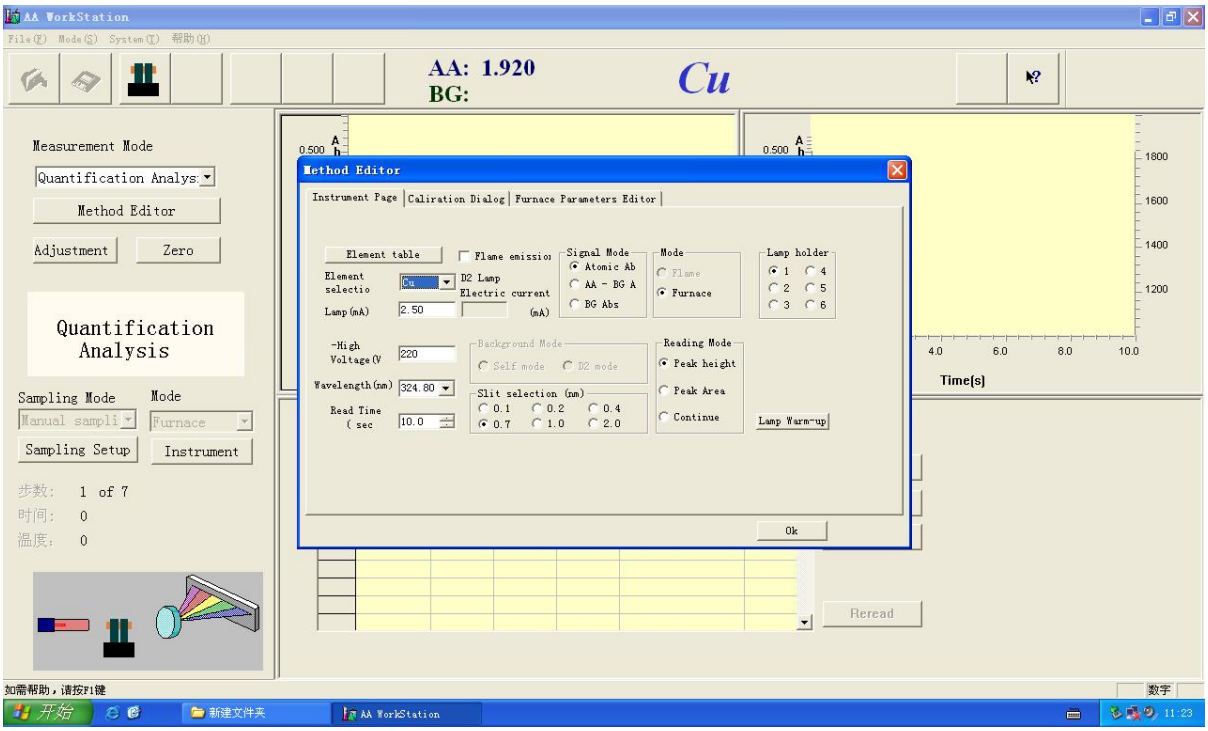


Figure 4-6

Setting password of the workstation

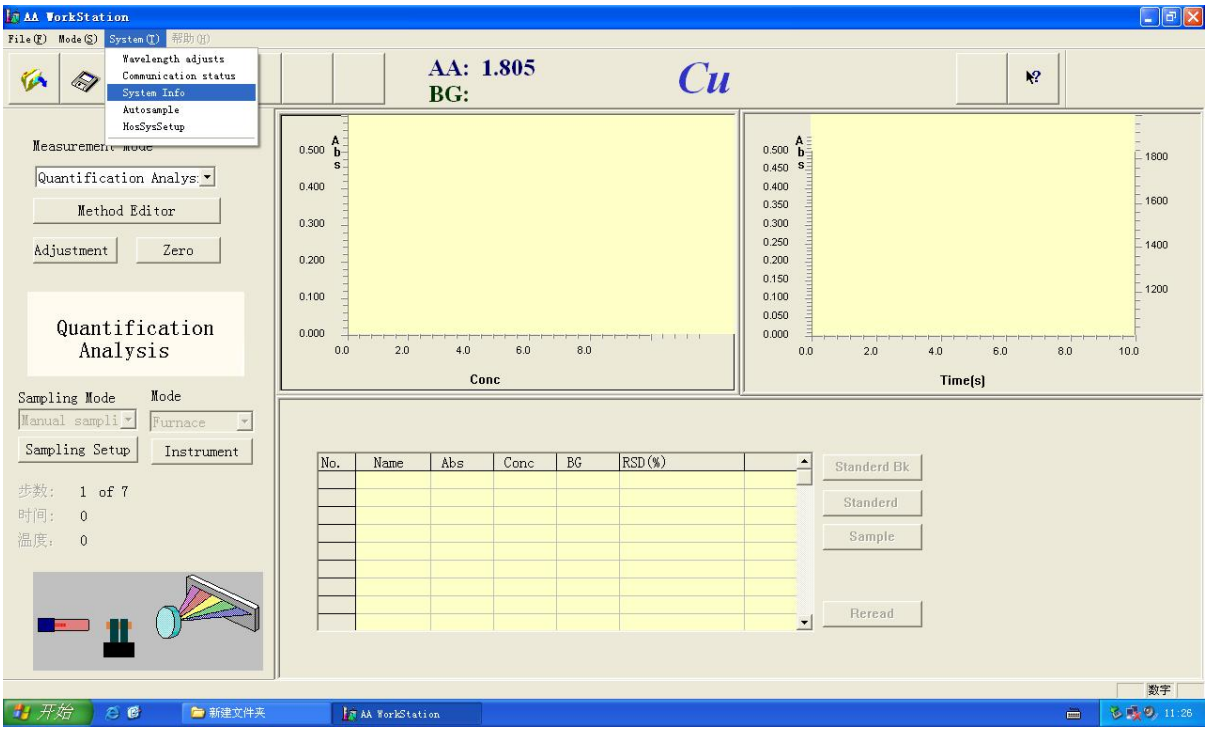


Figure 4-7

5.Select the System / system info in the menu bar, as shown in Figure 4-7, the dialogue box is shown in Figure 4-8

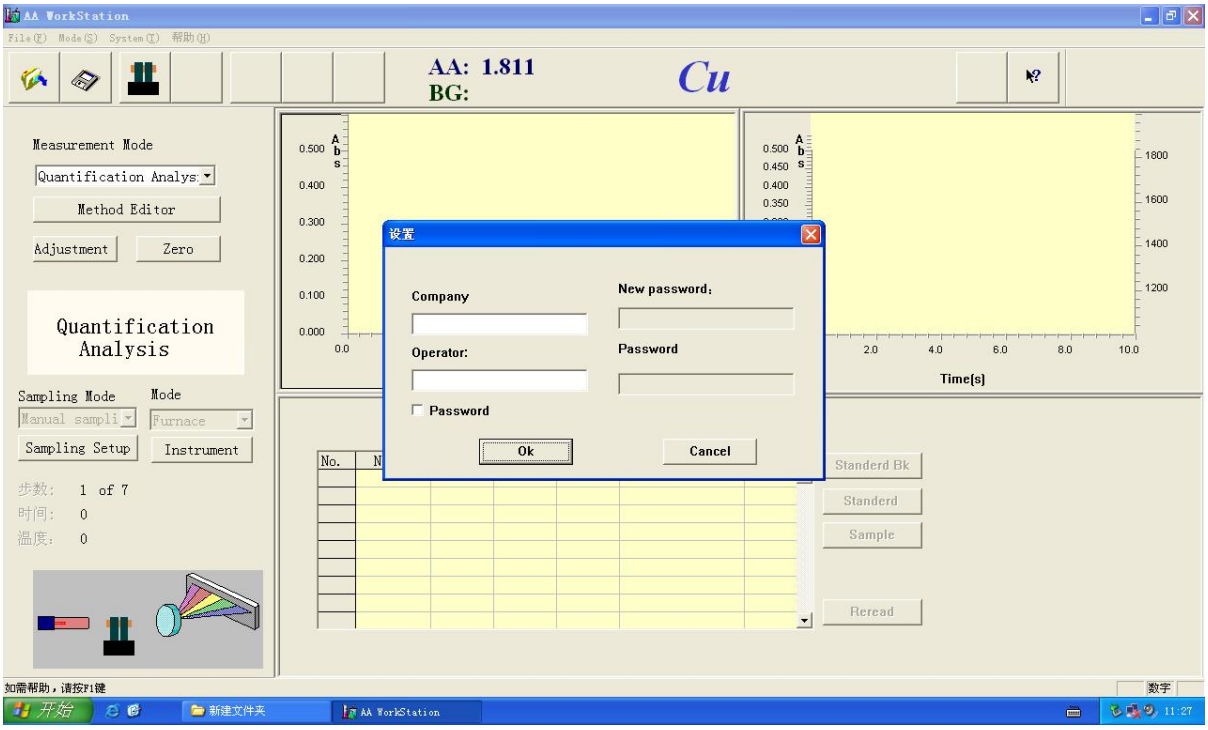


Figure 4-8

6. Select the " password" dialog box, enter a password, and enter again to confirm. Figure 4-9.

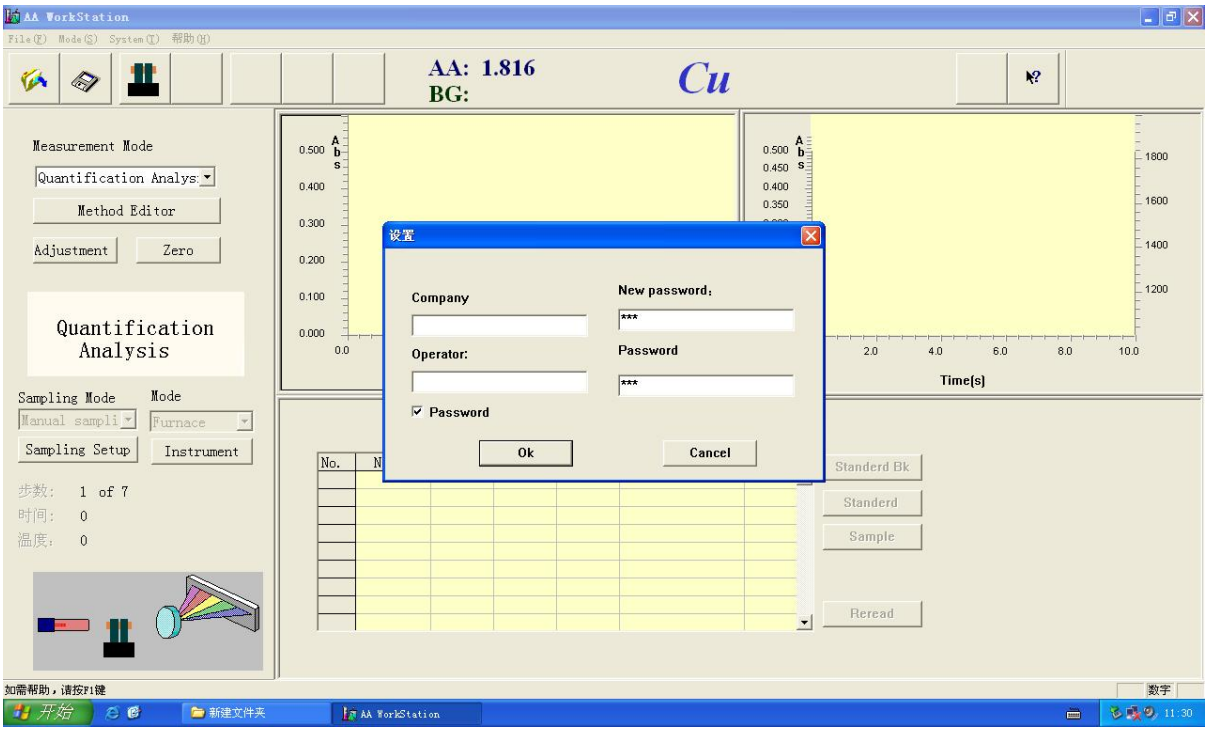


Figure 4-9

7.click on ok button,complete the password setting

NOTICE The User can set password of AAS workstation according to their own need. If you forget the password, please re-install the workstation software.

Introduction of Method Editor Window

"Instrument Page","Caliration Dialoge" and "Furnace Parameters Editor" are in the window,Figure 4-11

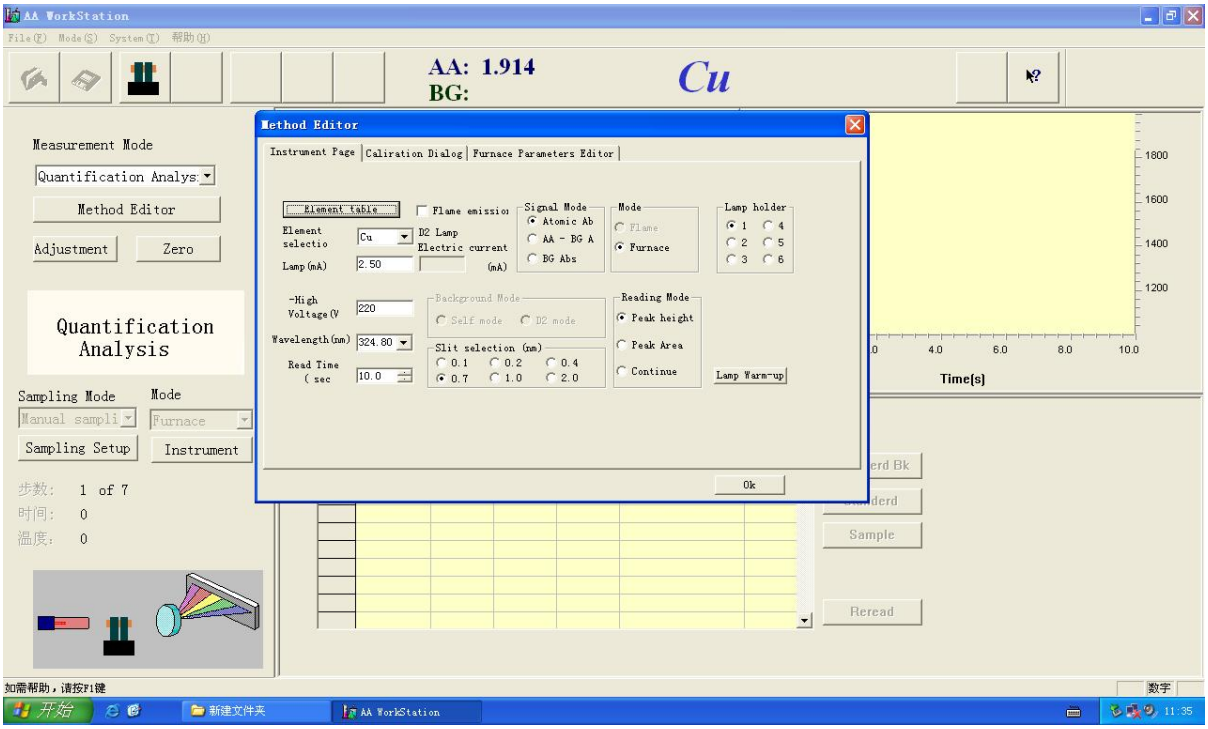


Figure 4-11

Parameter settings window

1.Choosing element. There are two methods to check element, one is click on the 【Element Table 】 button (Figure 4-11), pop up a element table (Figure 4-12).

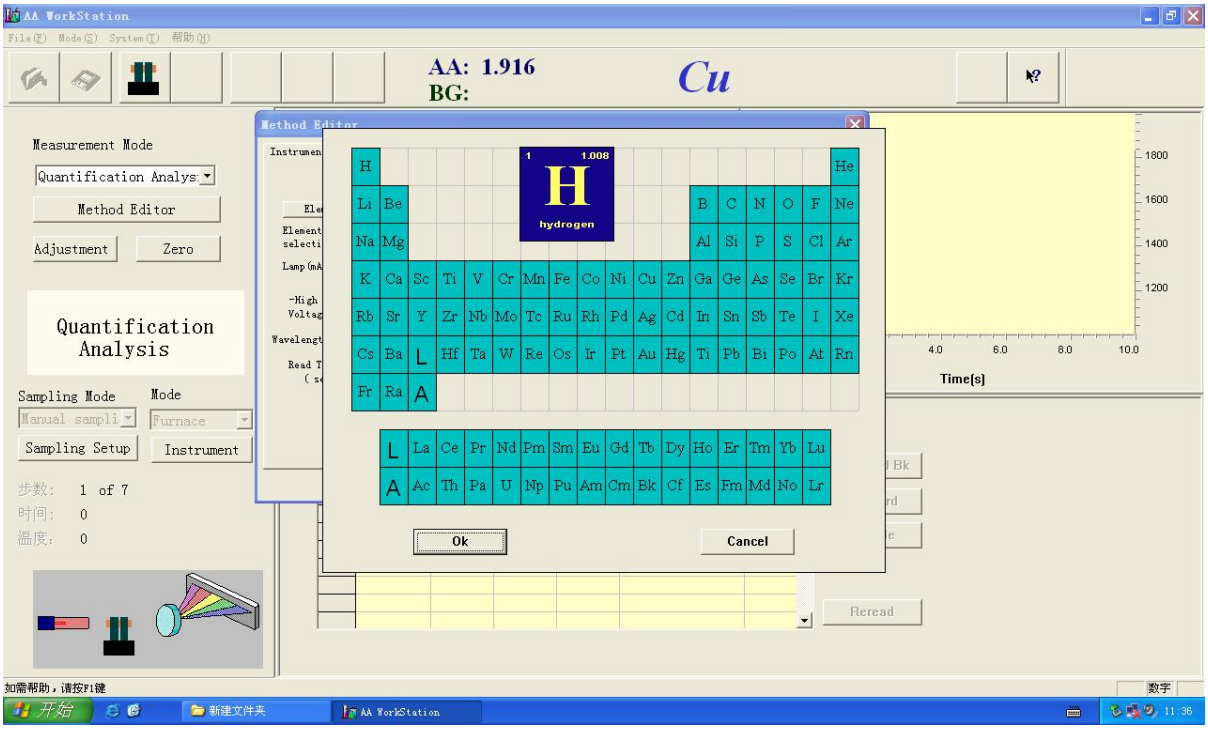


Figure 4-12

2. Select an element and click, then the element is checked and displayed in prominent position, as shown in Figure 4-13.

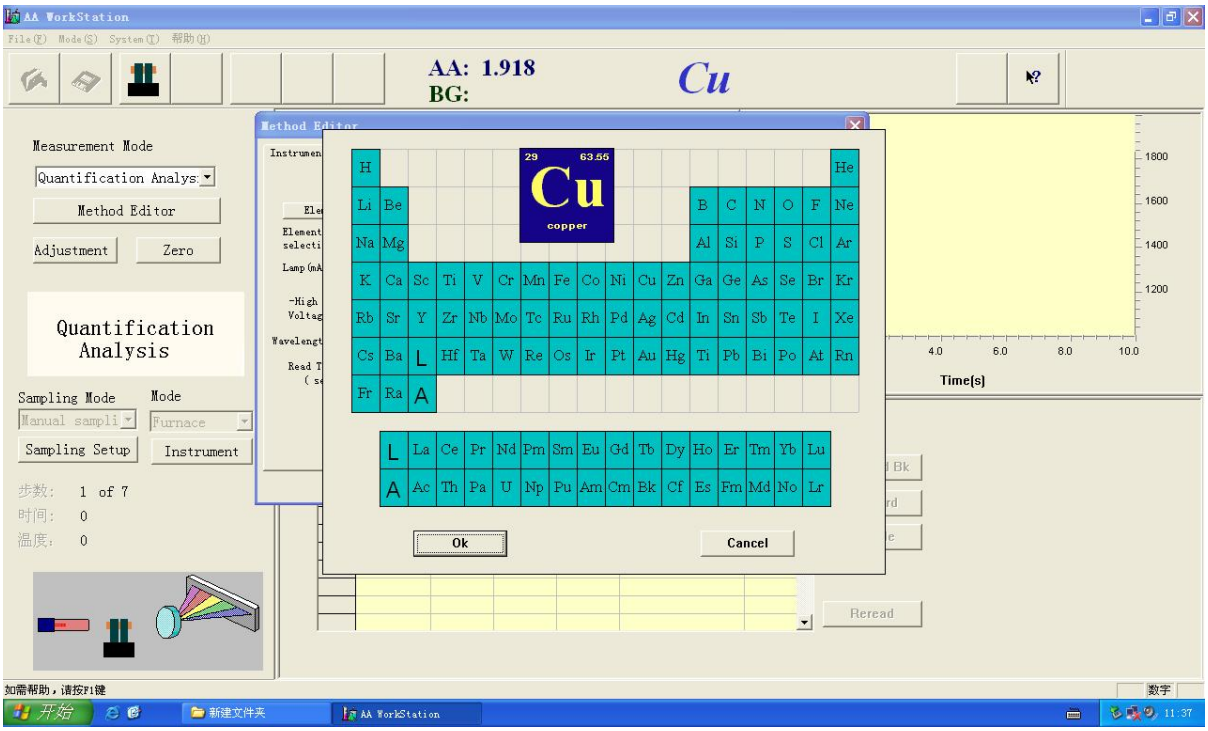


Figure 4-13

3. Click on 【OK】 button to closure "Element Table" dialog box, , Cu element is checked. If you click on

Cancel button, then close the dialog box, this element is not checked.

4. The other method is select one element on the “Element Selection” drop-down box and click on it (Figure 4-14), the element is checked

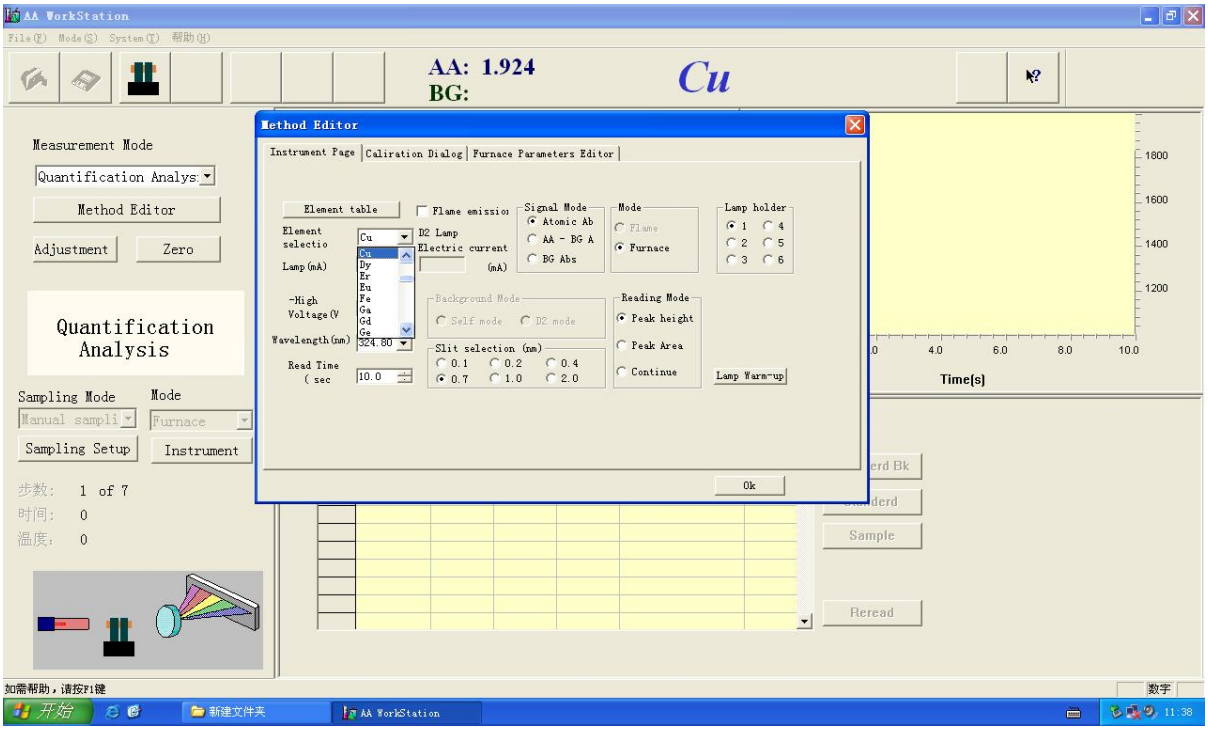


Figure 4-14

NOTICE when the element chosen has no corresponding analytical condition it can not be analyzed.

5. Wavelength choosing. The default wavelength is main sensitive line of selected element,if u want to select another sensitive line move the cursor to "wavelength" drop-down box,check one and click on a wavelength value, the wavelength is selected, as shown in Figure 4-15.

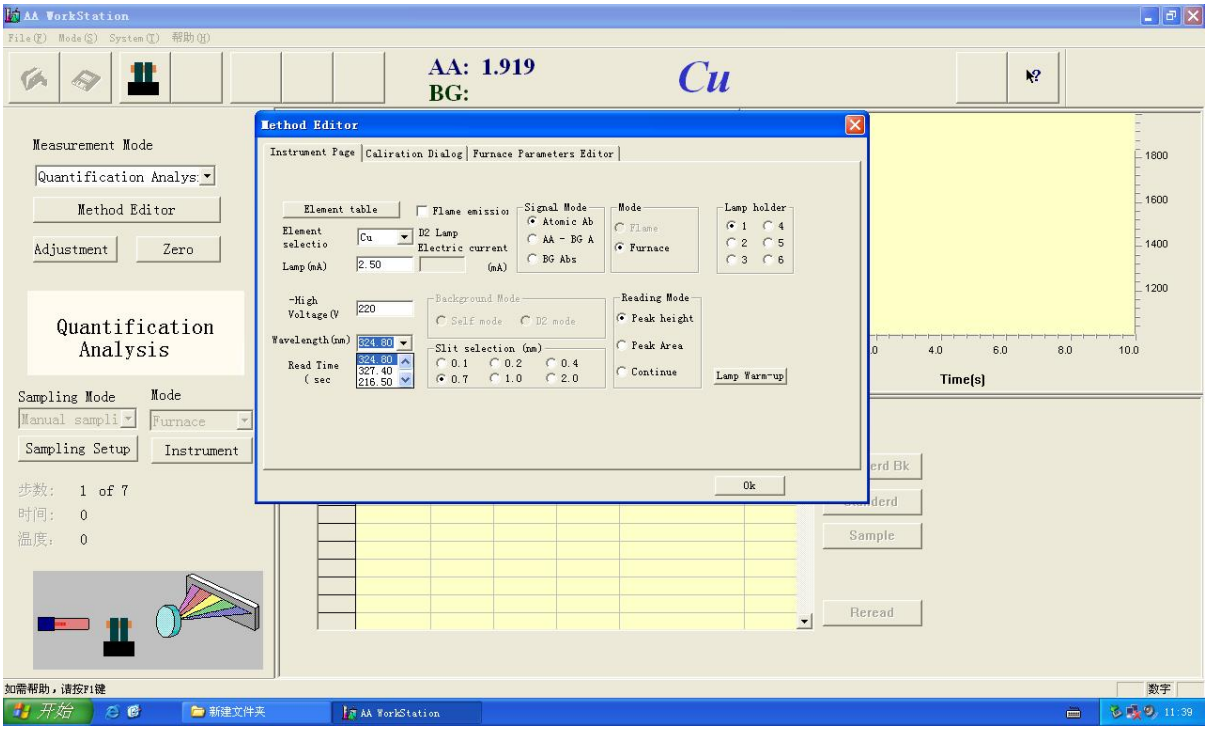


Figure 4-15

6. Negative high voltage choosing. Input the negative pressure value in the “-high voltage “text box. The value is between 0 and 800V (Figure 4-16).

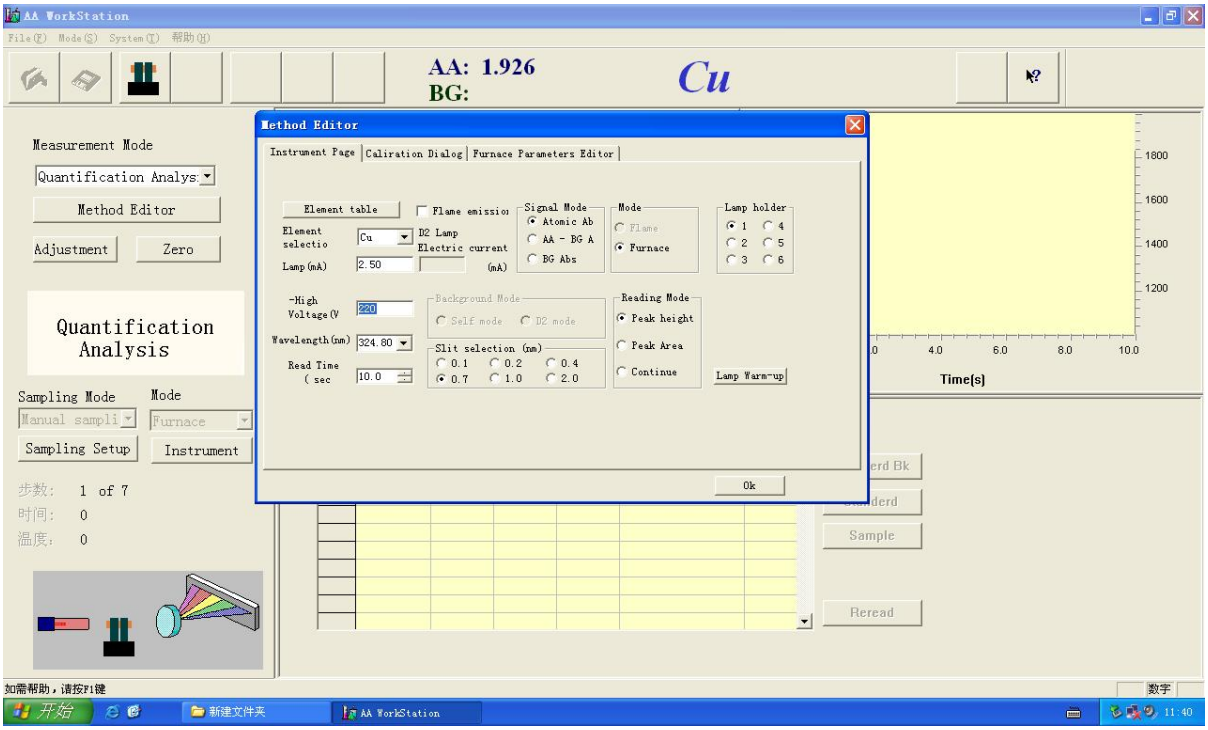


Figure 4-16

7. Lamp current choosing. input current value in the “lamp(mA)” text box. The value is between 0 and 12mA. (Figure 4-17).

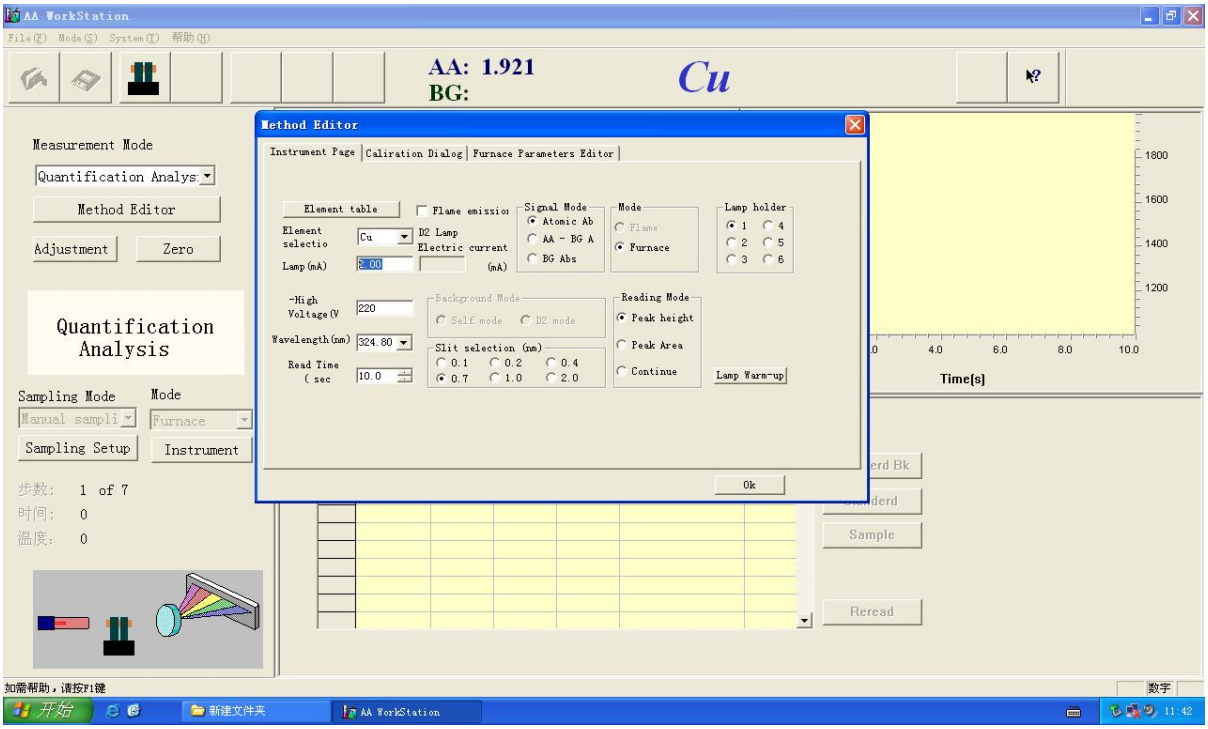


Figure 4-17

8. Signal Mode. There are three signal modes(atomic absorption, background absorption, background correction). Choose random one in the radio box, (dot inside the radio box shows it is selected), as shown in Figure 4-18.

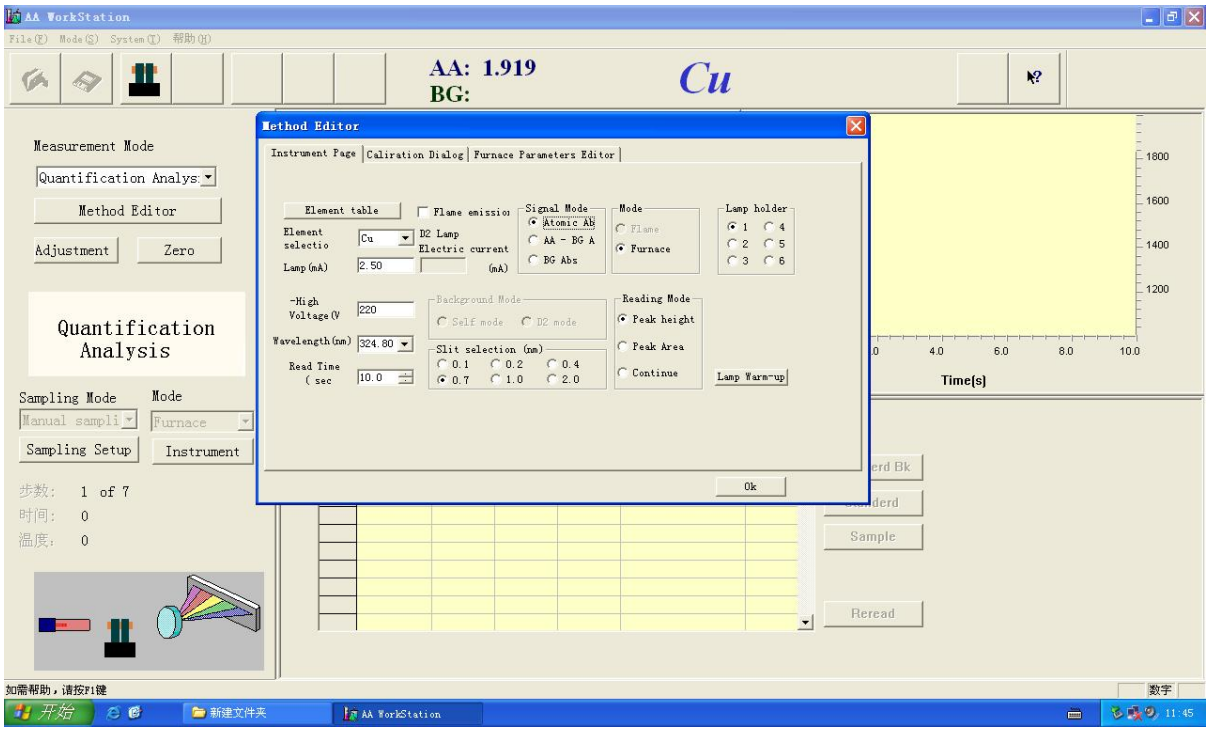


Figure 4-18

9. Each signal corresponds to different situation:

a. Select the "Atomic Abs" (Figure 4-19), “D2 lamp electric current” is gray, background mode is also gray,”Flame Emission” is valid (check it or not).

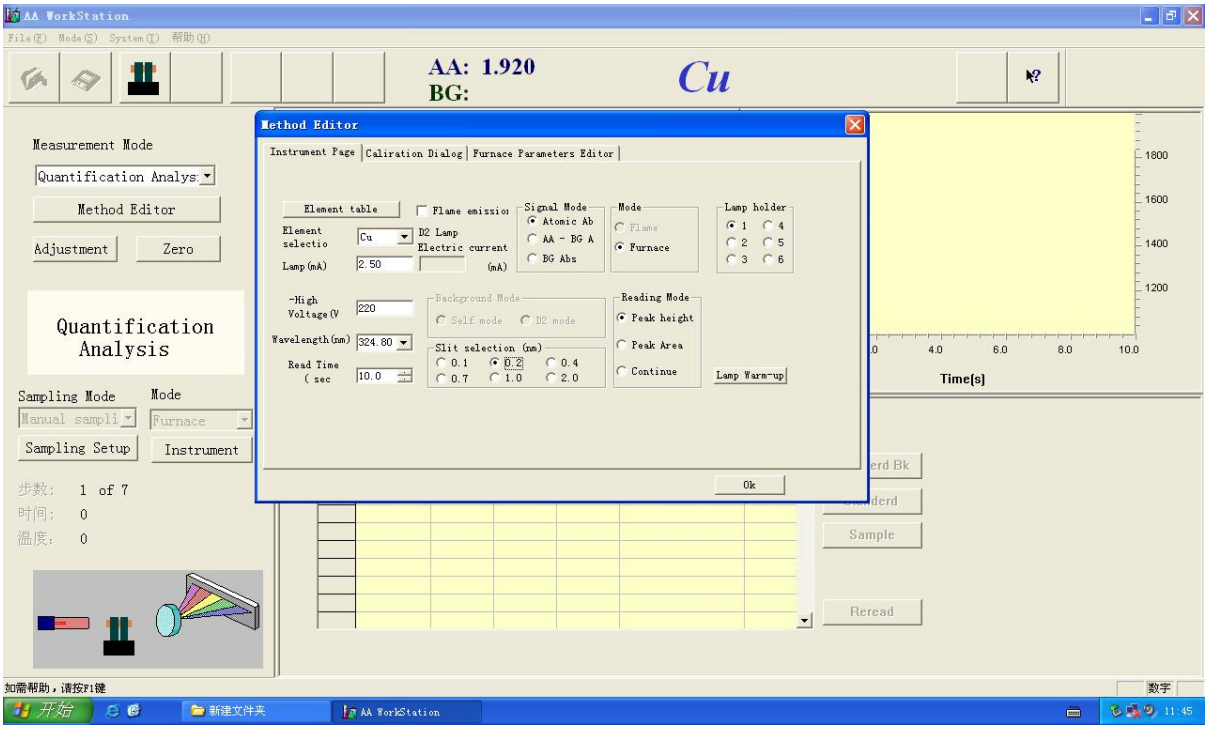


Figure 4-19

b.Select the "AA-BG AE" (as shown in Figure 4-20), “Background Mode” and “D2 Lamp Electric Current” are valid, the”Flame emission” is gray

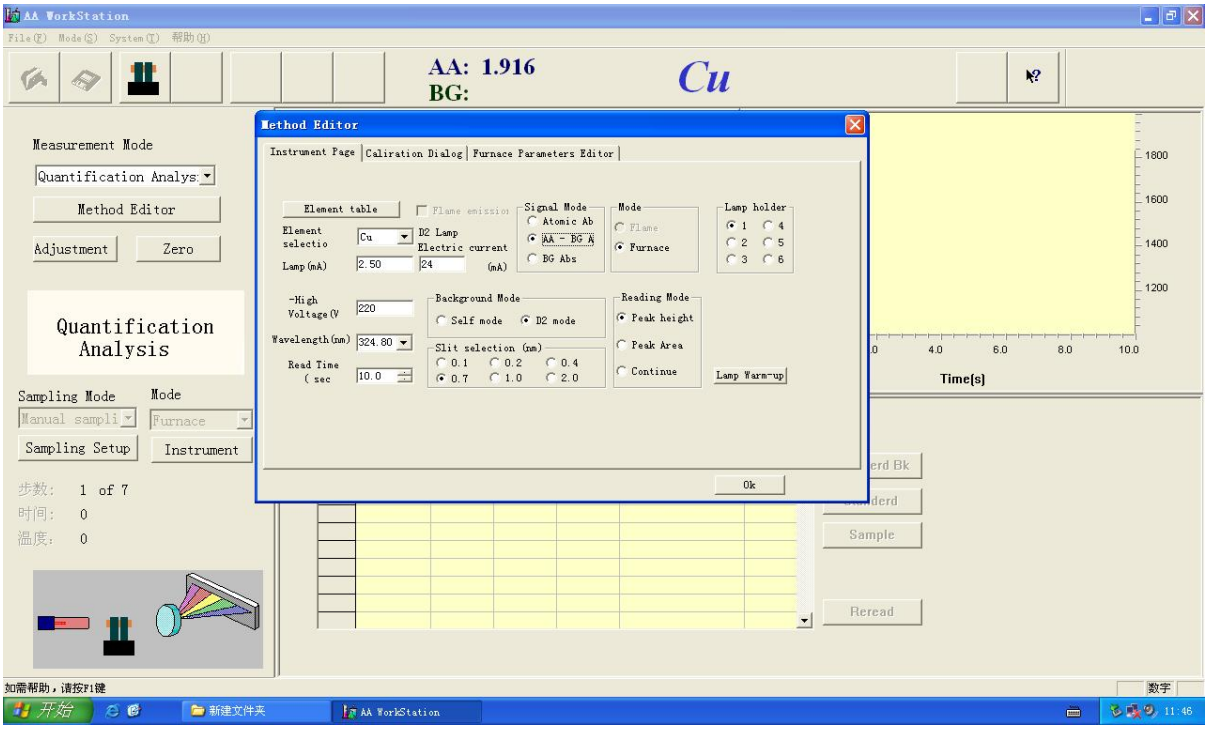


Figure 4-20

c.Select the “BG Abs”, the”Flame emission” and “D2 Lamp Electric Current” are valid, “Self mode” is gray(as shown in Figure 4-21)

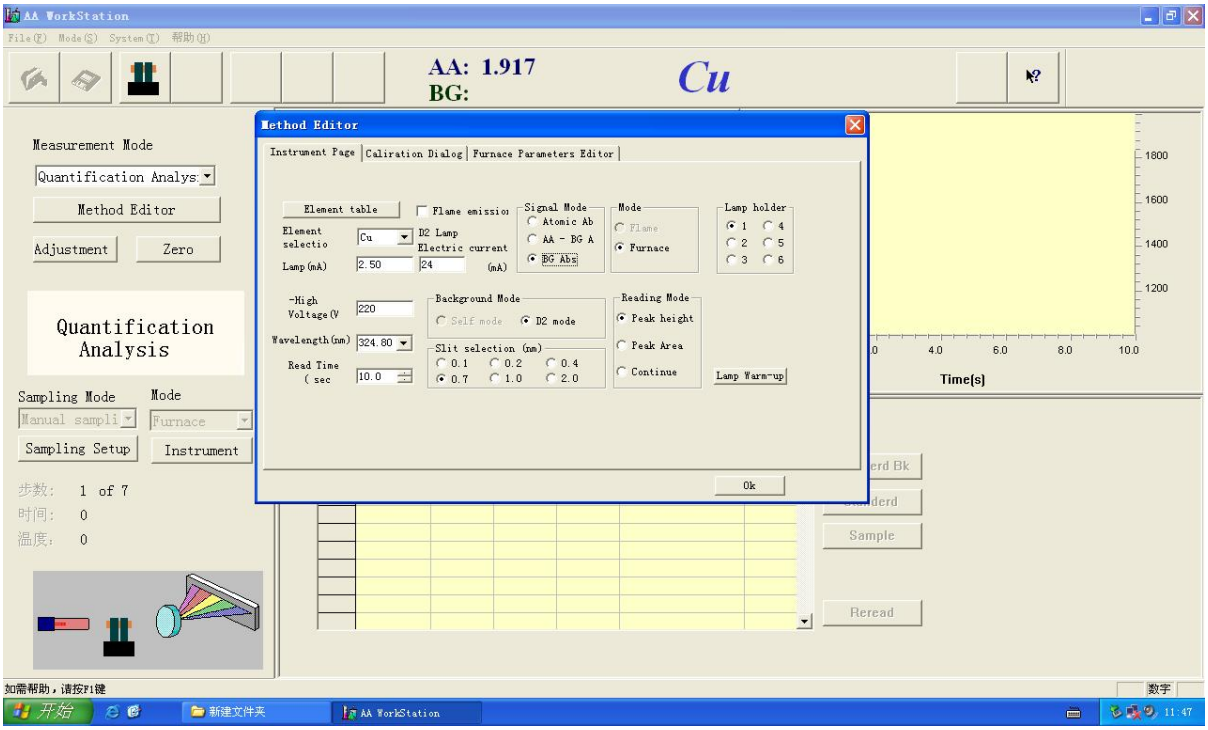


Figure 4-21

10．Setting D2 lamp electric current,there are the following cases:

a.Select the "Atomic Abs“ on “Signal Mode”, “D2 lamp electric current” input box is gray

b.Select the "AA-BG AE" on “Signal Mode”,there are two cases are possible:

1)Select the”D2 mode” on “Background Mode”,input the current value into the text box.The value is between 24-93mA,the default value is 24mA(Figure 4-22)

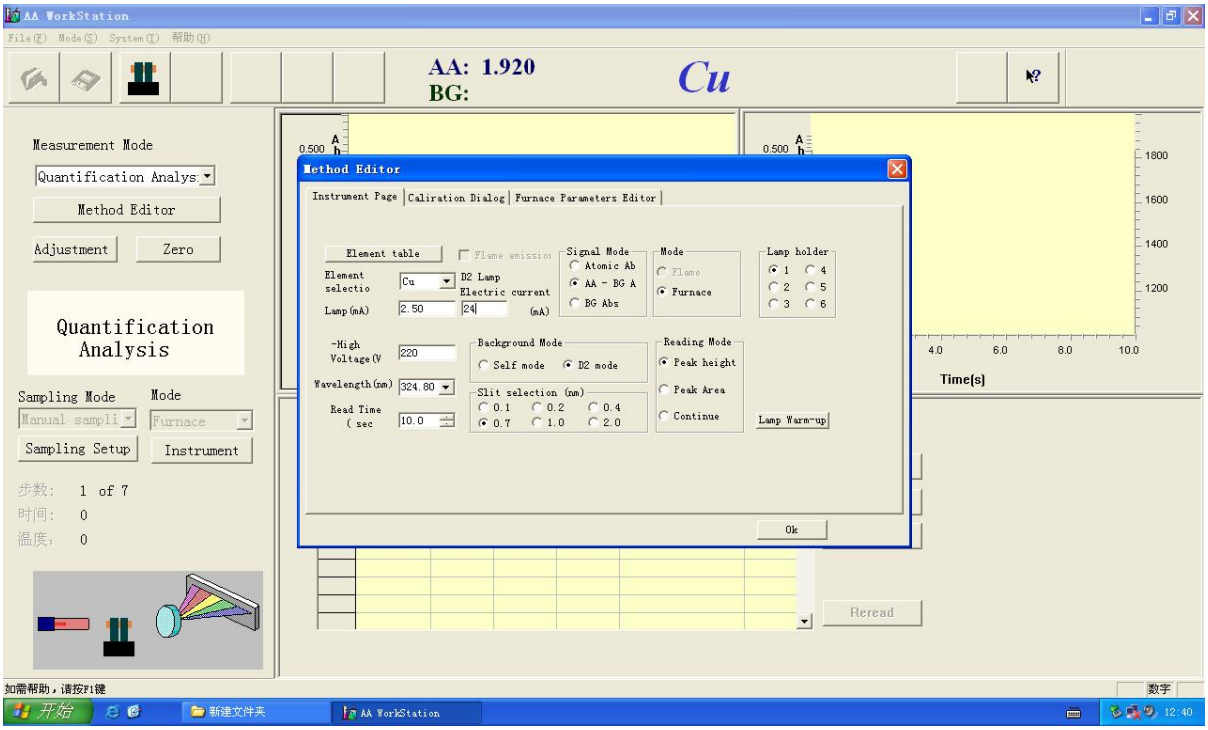


Figure 4-22

2)Select the “Self mode” on “Background Mode”,the text box of “D2 lamp electric current” change into “Self electric current”, input the current value into the text box(Figure 4-23).The value is between 0-14mA, the default value is 2mA

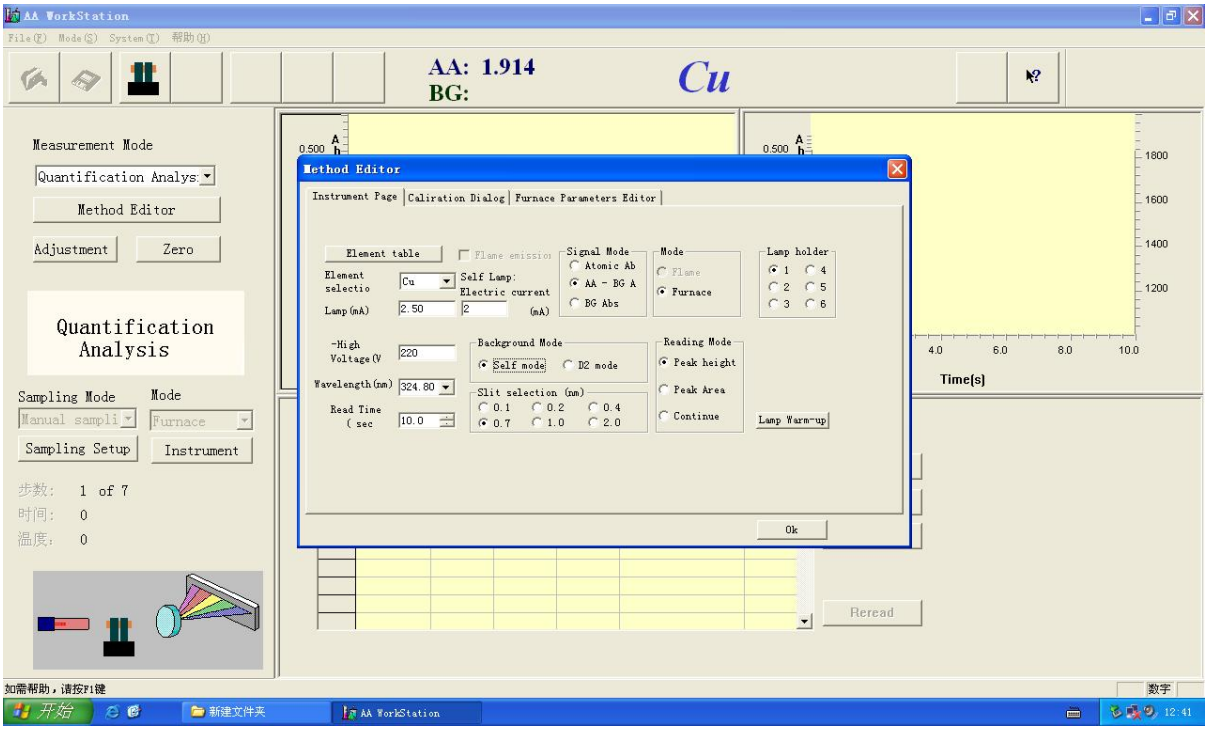


Figure 4-23

c.Select the “BG Abs” on “Signal Mode”, the text box of “D2 lamp electric current”is valid (Figure 4-24)

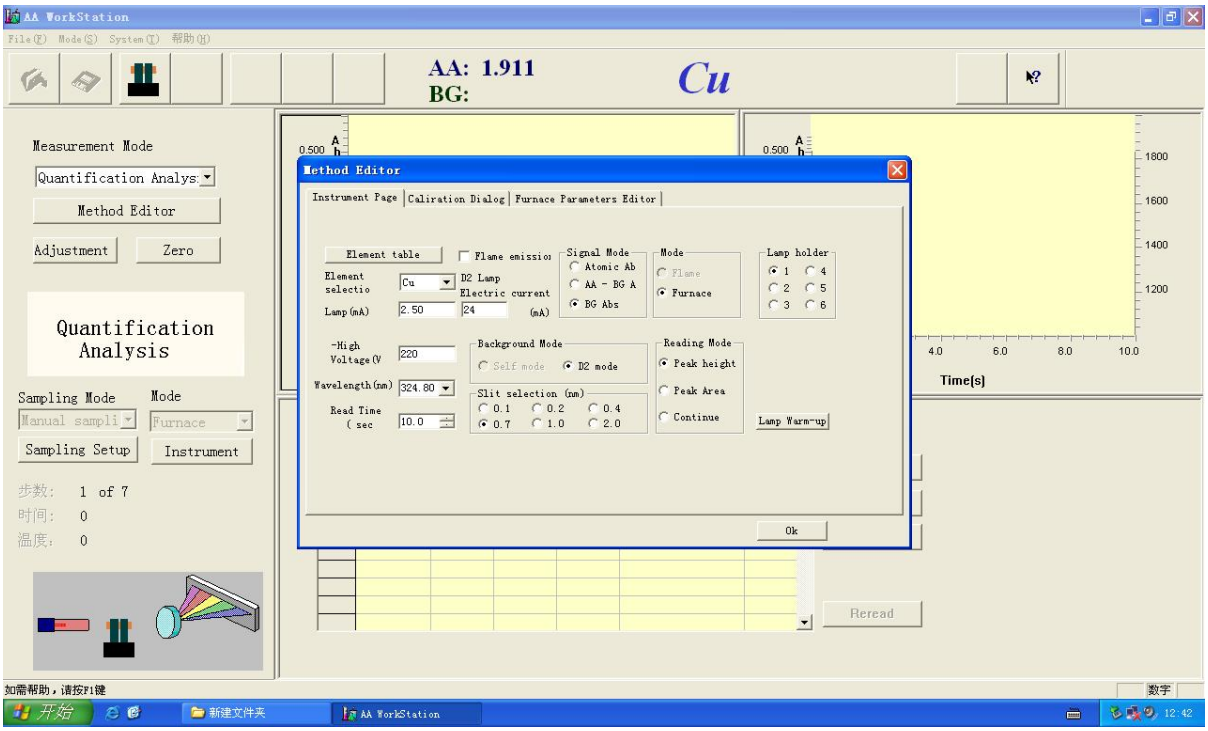


Figure 4-24

11.”Slit Selection(nm)”,only can select one among 0.1,0.2,0.4,0.7,1.0,2.0(Figure 4-25)

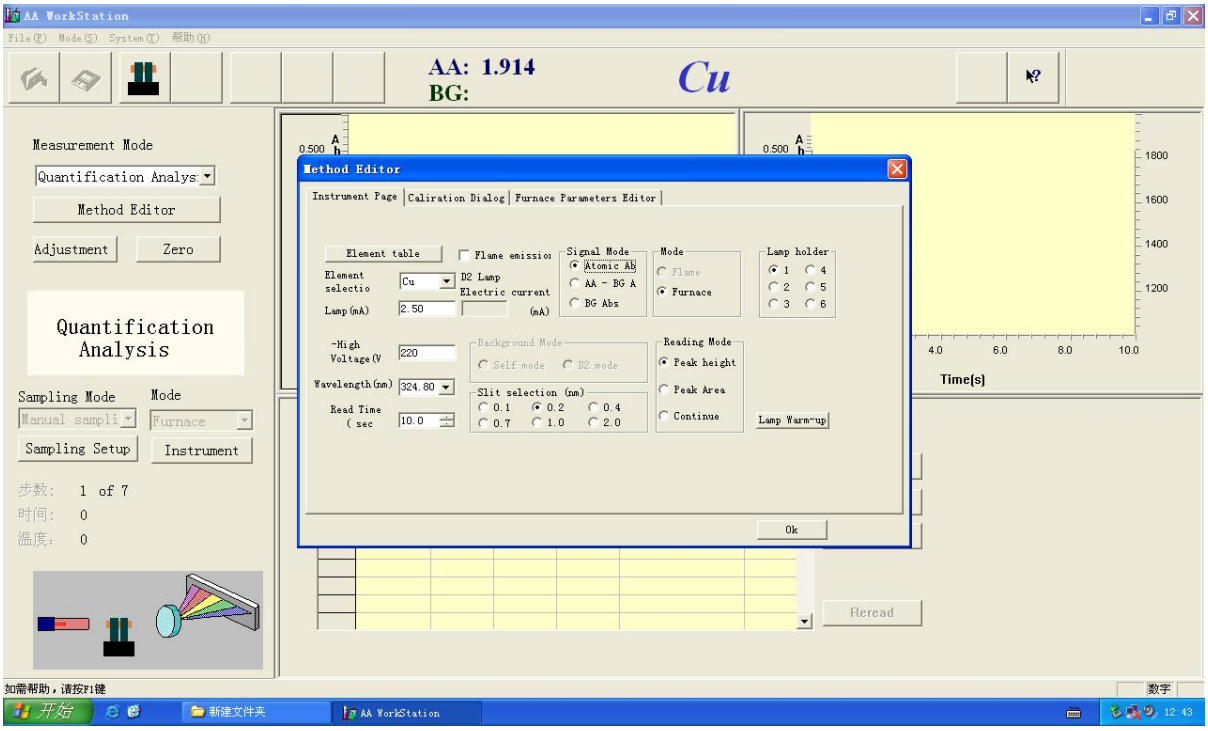


Figure 4-25

12.”Lamp Holder”.only can select one among1,2,3,4,5,6(Figure 4-26)

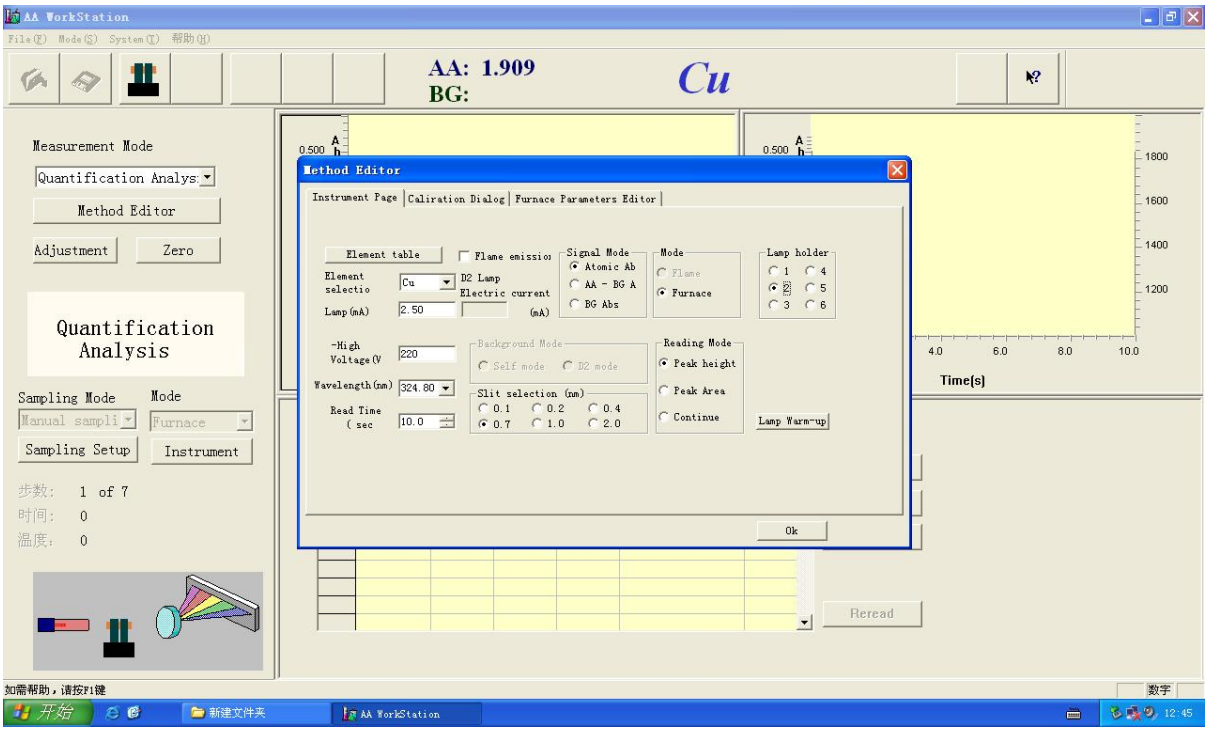


Figure 4-26

15.There are two modes,”Flame” and “Furnace”,the instrument can automatically identify different atomizer when it starts to work (Figure 4-29)

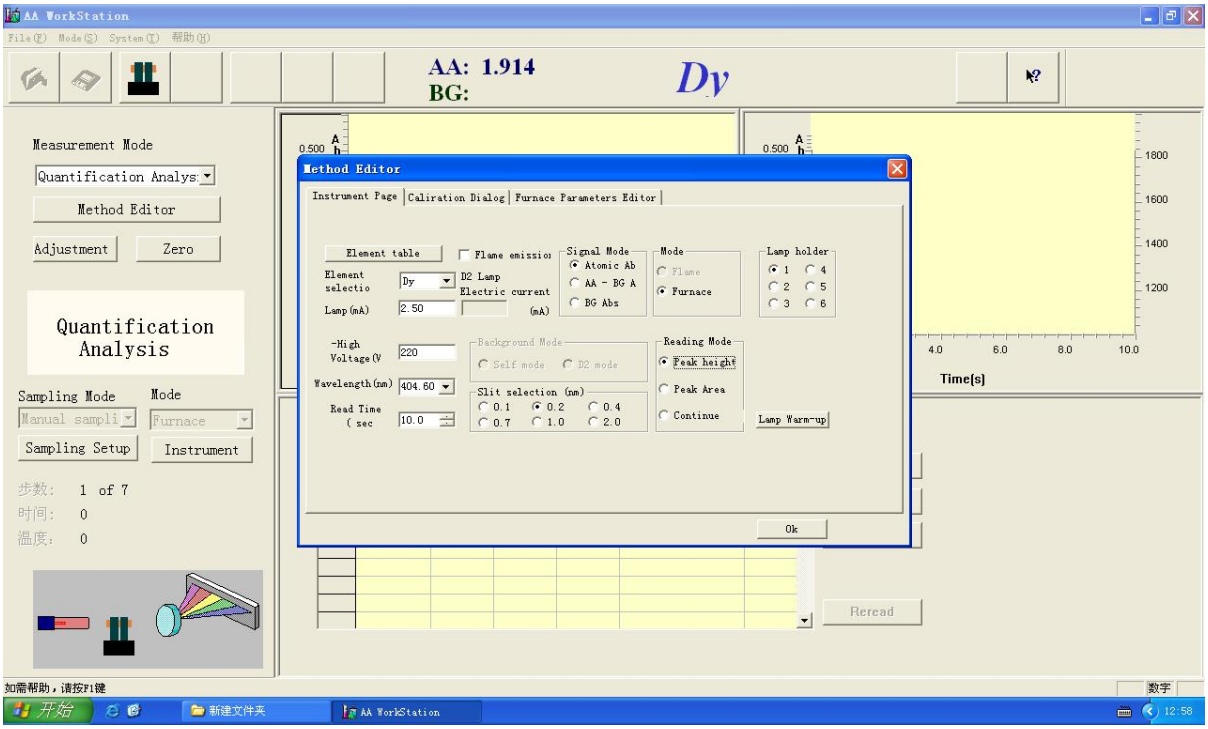


Figure 4-29

17.Press the “lamp warm-up”,display the figure 4-31 dialoge box,you can select more than one lamp to warm up.

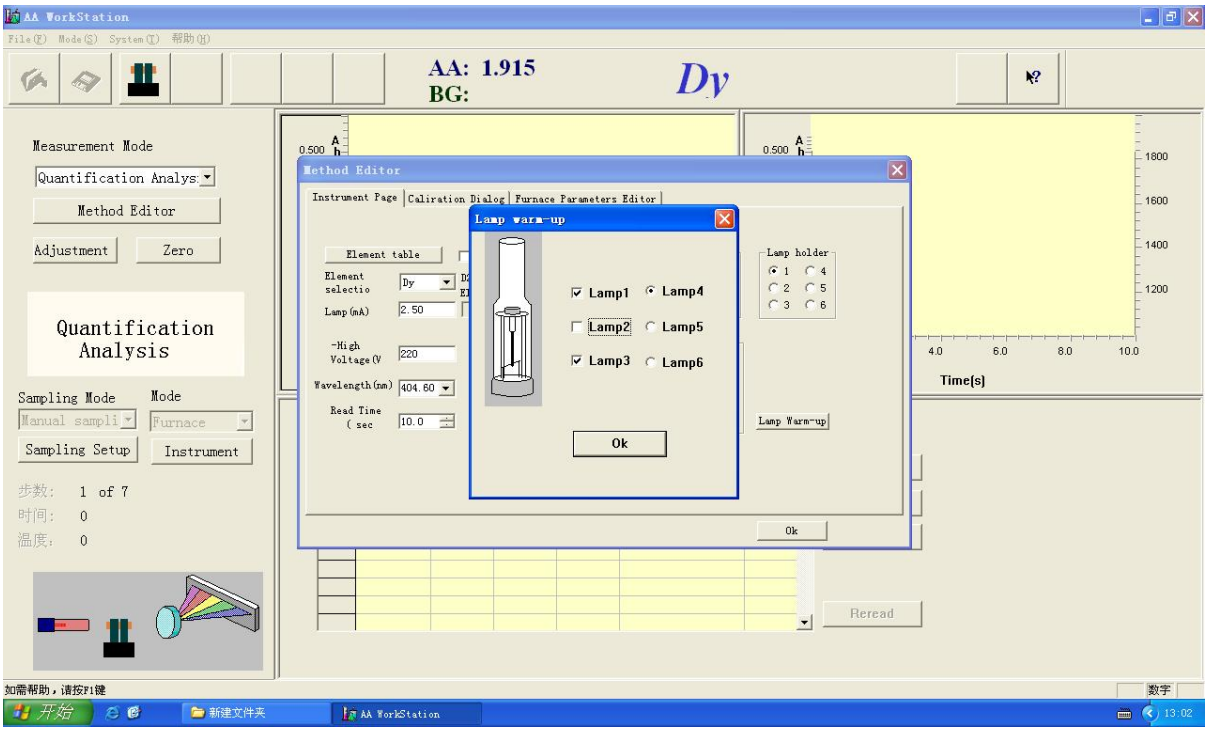


Figure 4-31

18.Method saving. After the above parameters setting

a.Select the “Save” on file menu,Figure 4-32

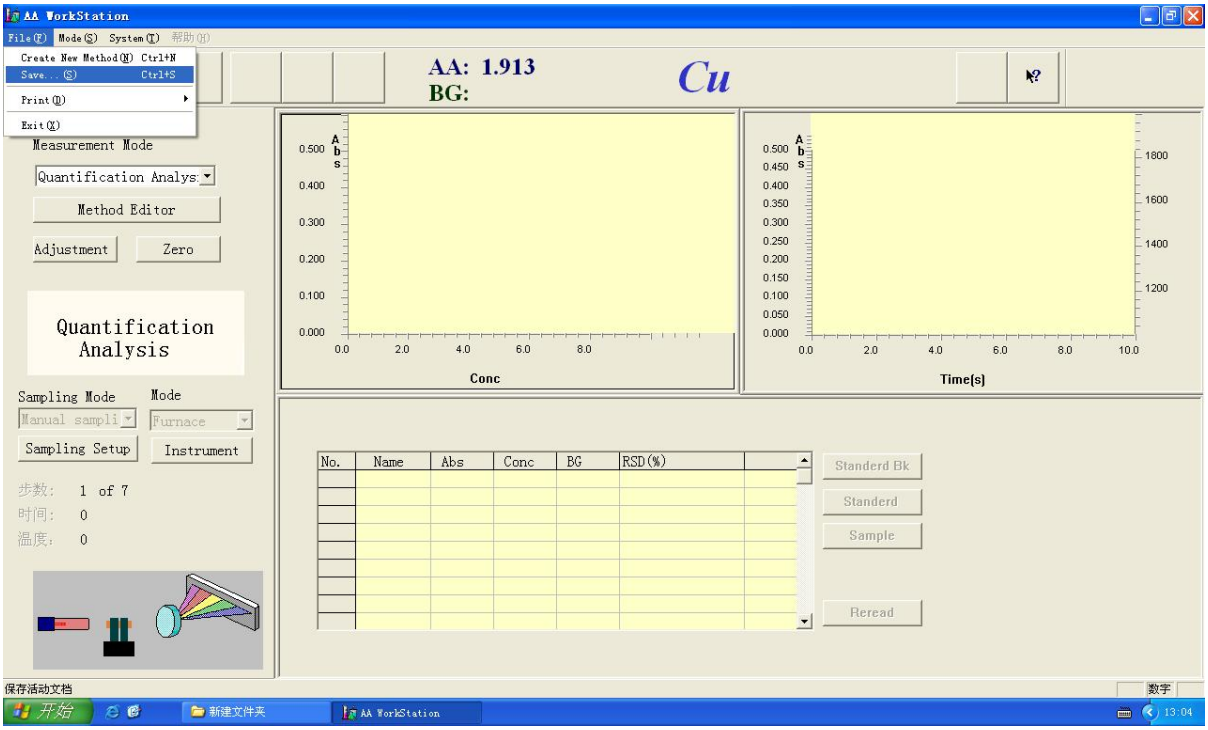


Figure 4-32

b.The “Sample Information” dialog box pops up shown as the Figure4-33

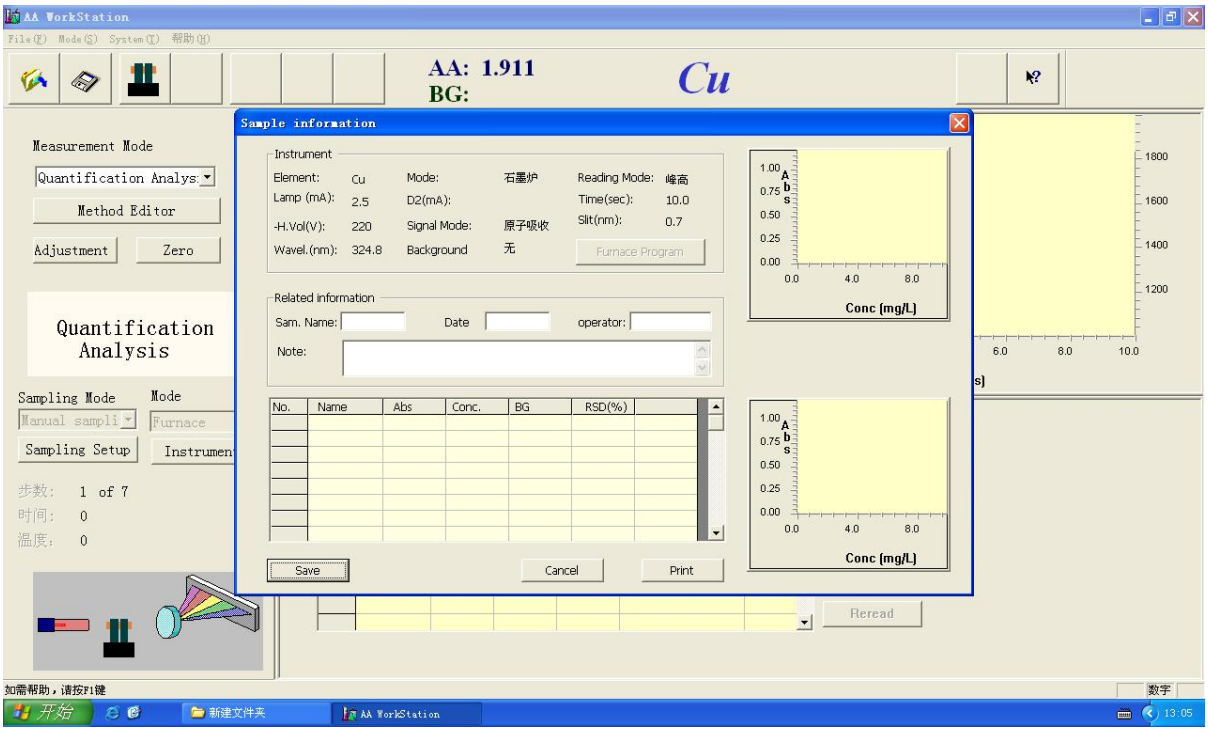


Figure 4-33

c.Press the “Save”,the “Save As” dialog box pops up,Figure 4-34.Input the file name and press the “Save”button.

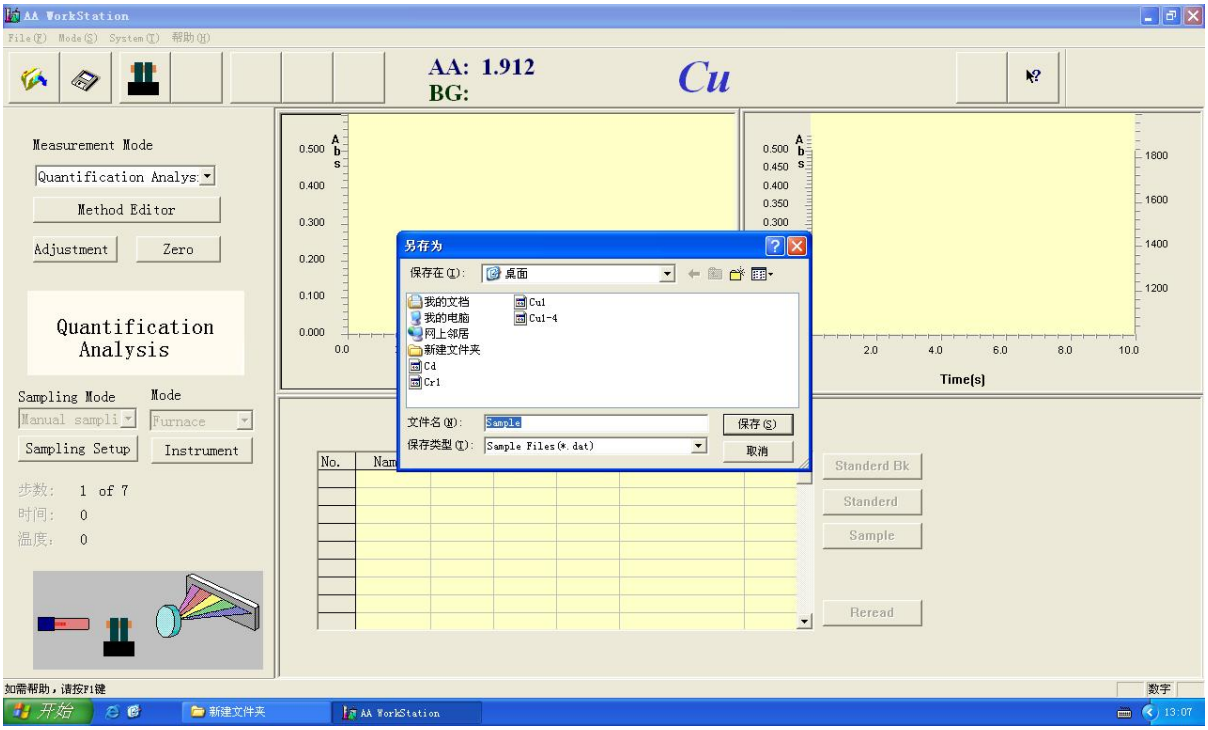


Figure 4-34

Calibration Dialoge Window

1.”Equation”.you can select one among the seven methods—“linear”,” calibration curve”, “linear standard addition method”, “curve standard addition method”,” the absorbance direct reading”, “single-point method”, “the standard deviation” (Figure 4-36)

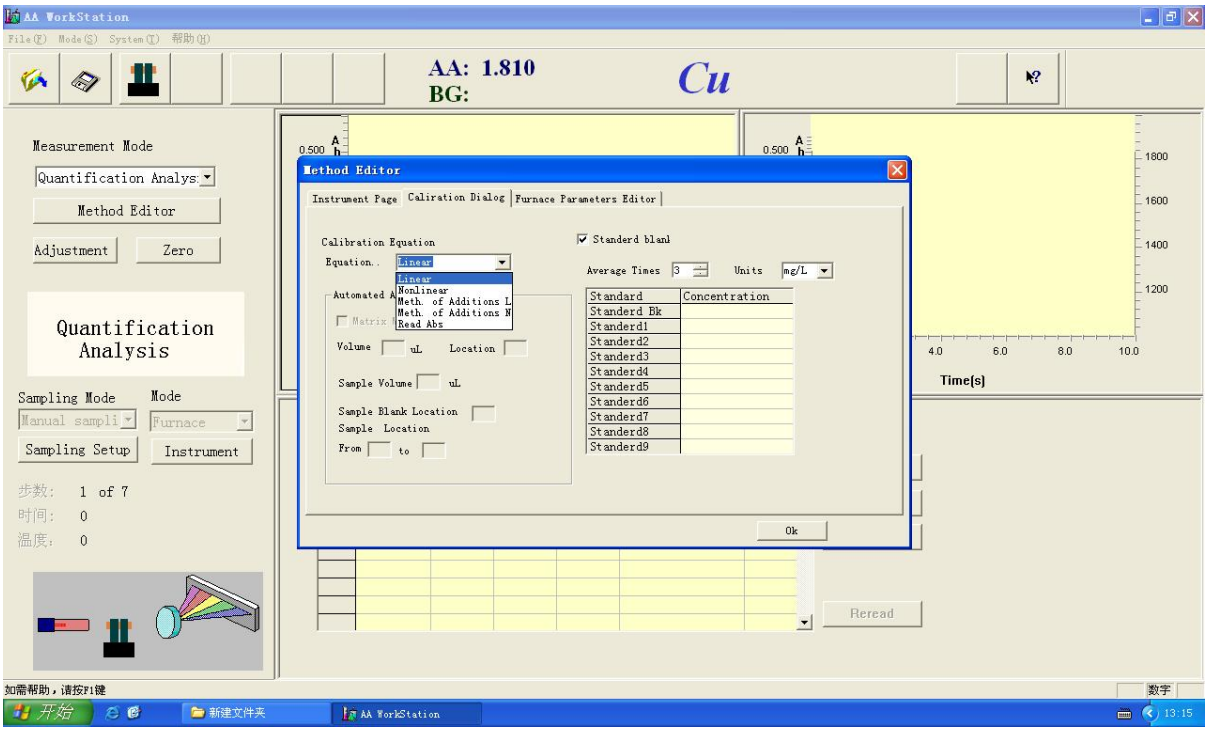


Figure 4-36

2.”Average times”.input an appropriate value between 1 and 20.Two methods,one is inputting the value directly in the input box,the other is press the arrow on the right of the input box(Figure 4-37)

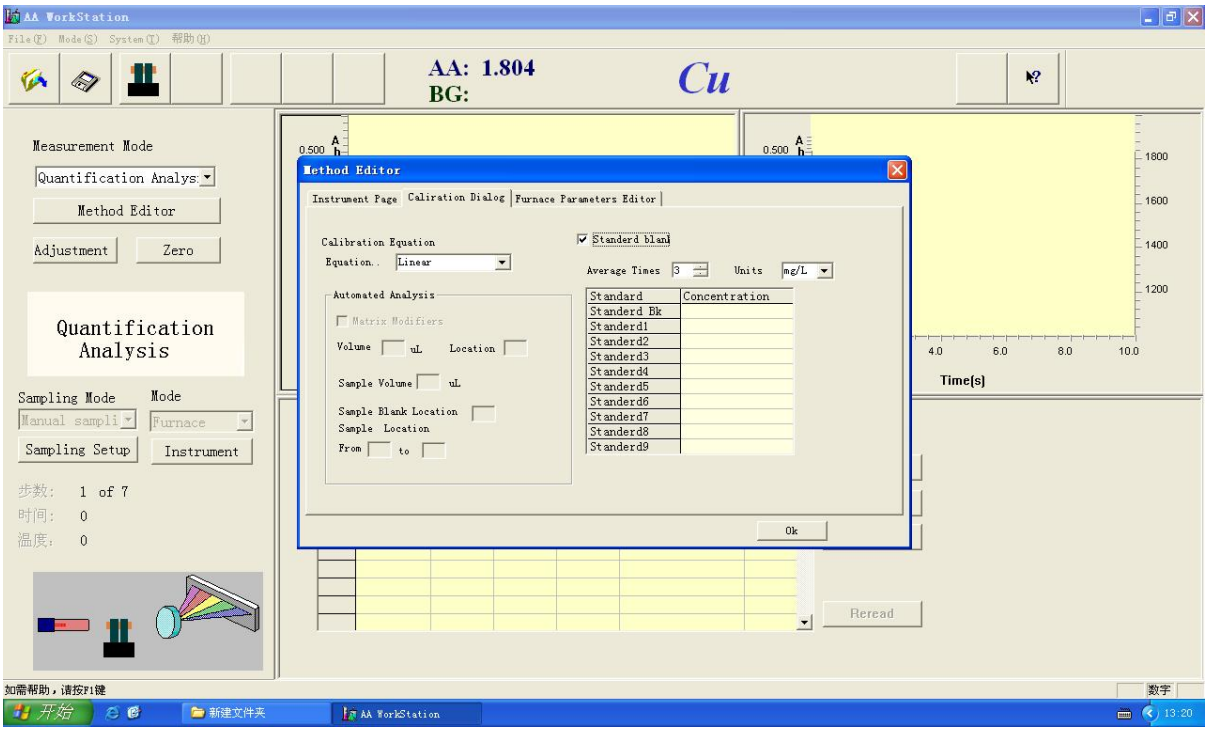


Figure 4-37

3.

Furnace Parameters Editor

1. The window is shown in figure 4-40a,input appropriate numerical values in the form,the range of the parameters are as follows:

Step	Temperature	Ramp	Hold	Internal flow	External flow	Read
1-19	20-3000	0-99	0-99	4 levels	0,1	0-99

Internal flow: 0 level-----0 ml/min
1 level-----100 ml/min
2 level-----200 ml/min
3 level-----300 ml/min

External flow:0 level-----0 ml/min
1 level-----400 ml/min

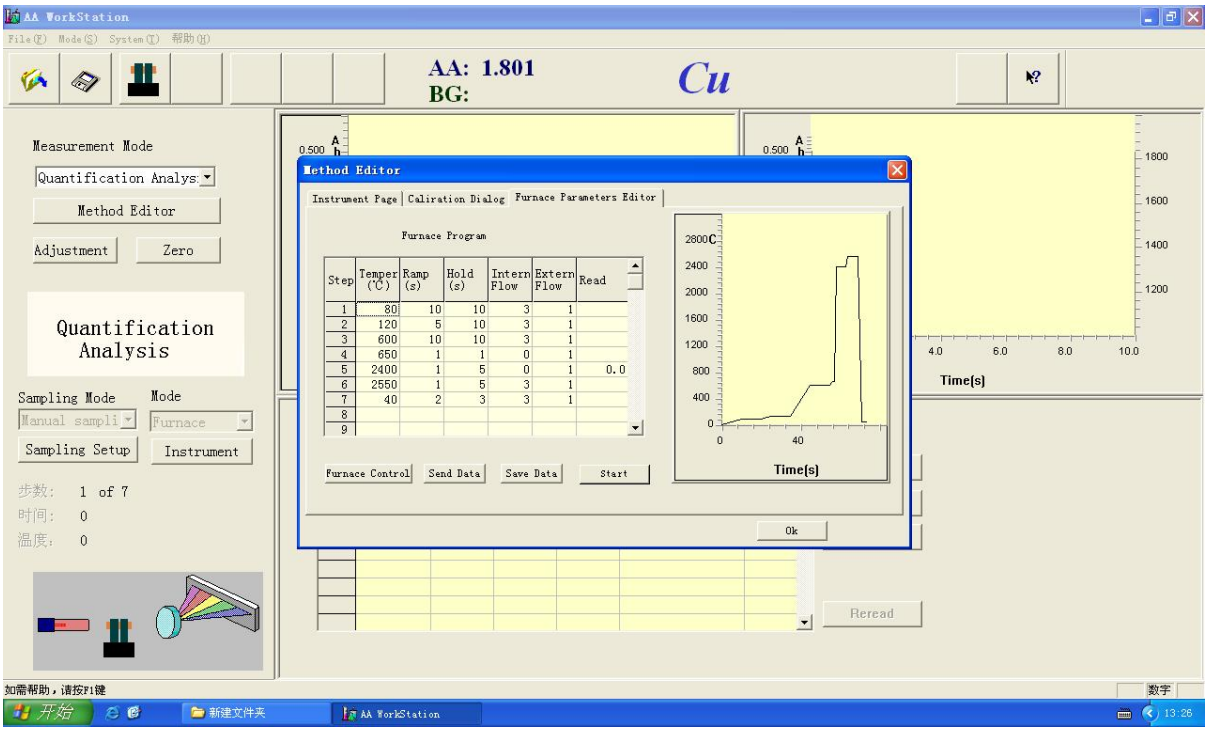


Figure 4-40a

NOTICE "Read" means delay time needed by the instrument,if some element in a slow peak it needs more time.

High-power heating(ramp=0) only appears one time in the whole heating procedure

2. If want to delete some warming step such as step 3,please move the cursor to the step 3 and click,Figure 4-40b

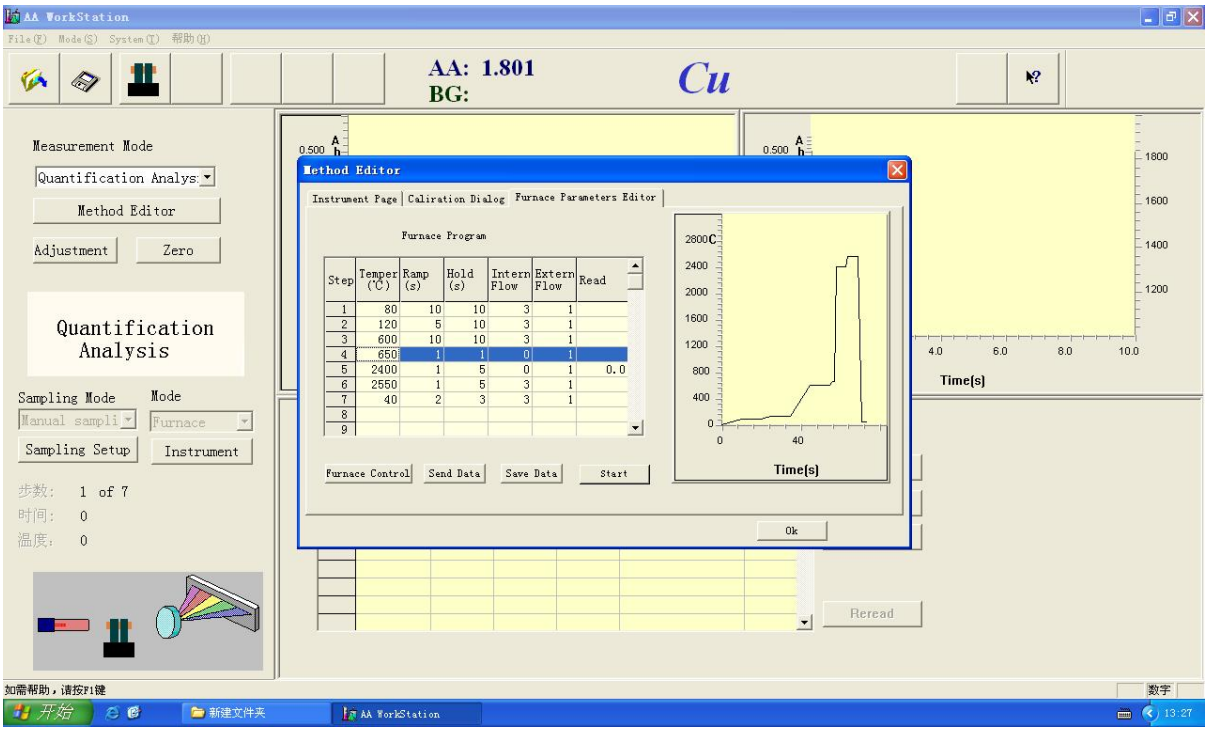


Figure 4-40b

Click the right button,Figure 4-40c pops up,press the “Delete”

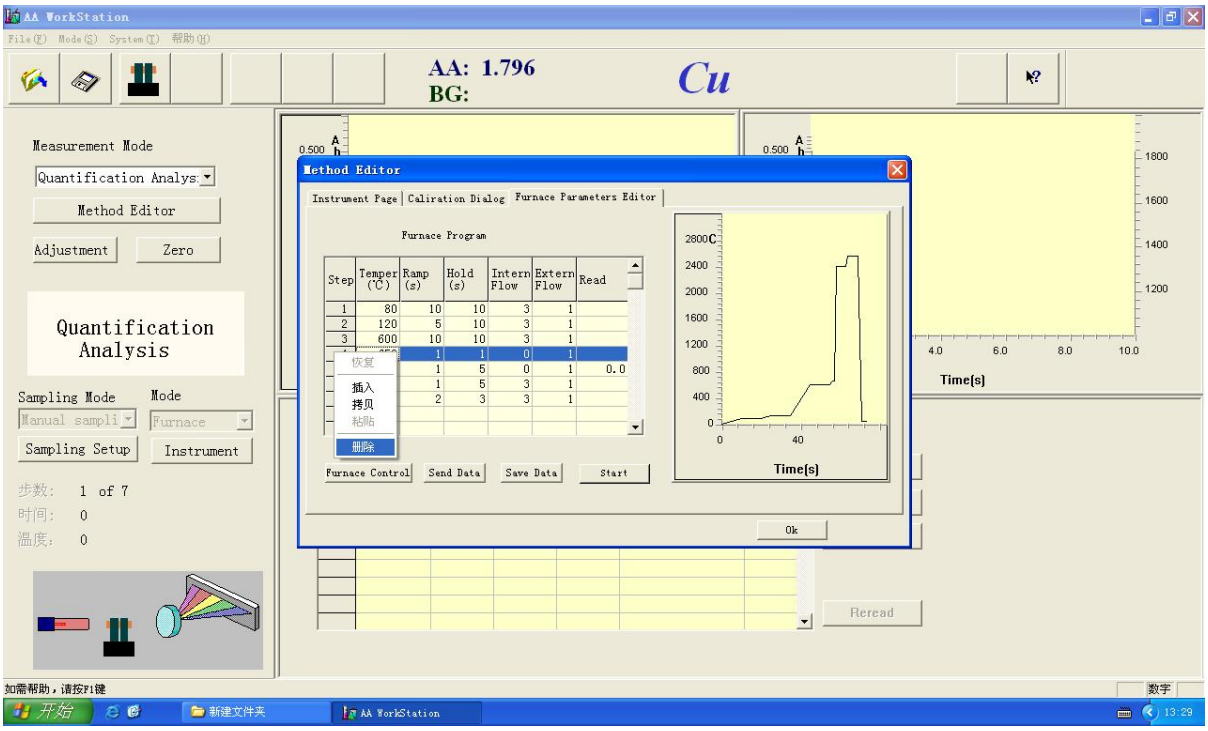


Figure 4-40c

Remarks:There has copy,insert and recovery functions except delete function.

3. Press the “Save Data” to save the heating condition.
4. Press the “Send Data” to send the heating condition to the graphite furnace.
5. Press the “Start” to start the heating(detailed introduction see the following chapters)
6. Press the “Furnace Control” the “Conditioning the Graphite Tube” window pops up(Figure 4-41),set clear time and clear temperature according to actual situation.The range of the clear time is 0~10,range of the clear temperature is 1000~3000.

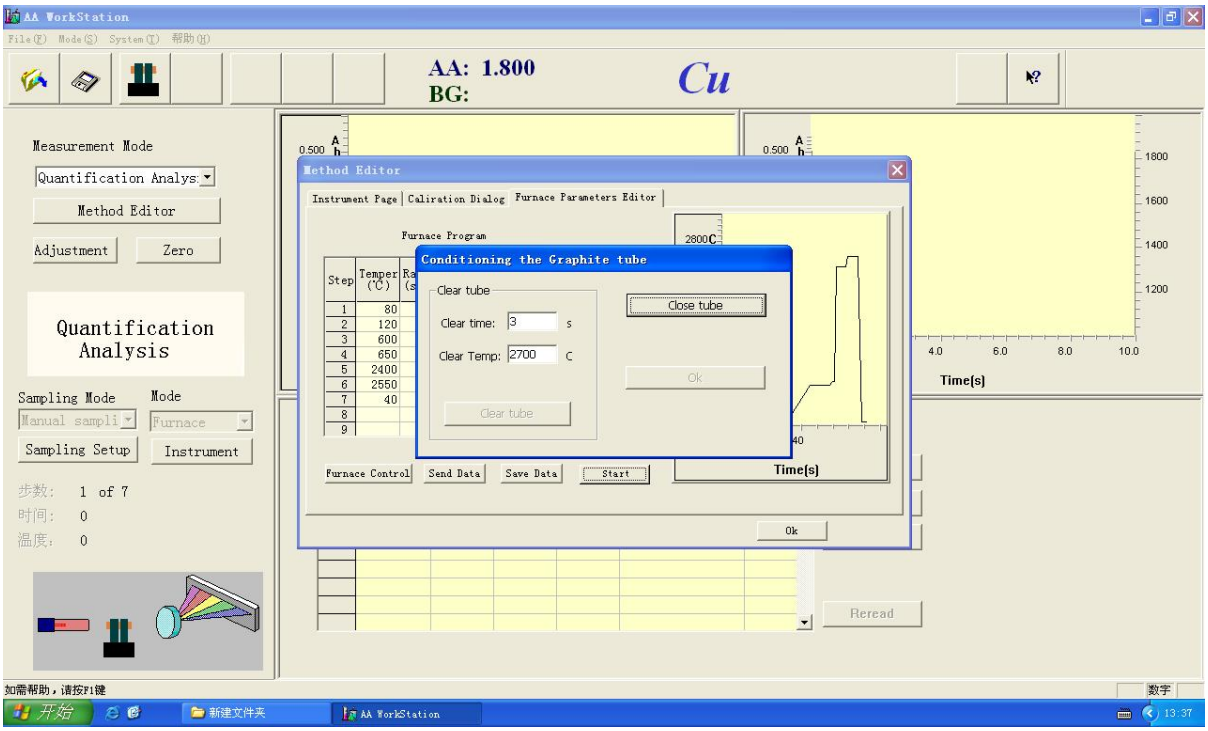


Figure 4-41

7. Click the “close tube” on the “Conditioning the Graphite Tube” window,the “close tube” changes into “open tube”,the “Clear tube”and “Ok” become bright(Figure 4-42).Press again the “Open tube”,the “Conditioning the Graphite Tube” window become that shown as in Figure 4-41.

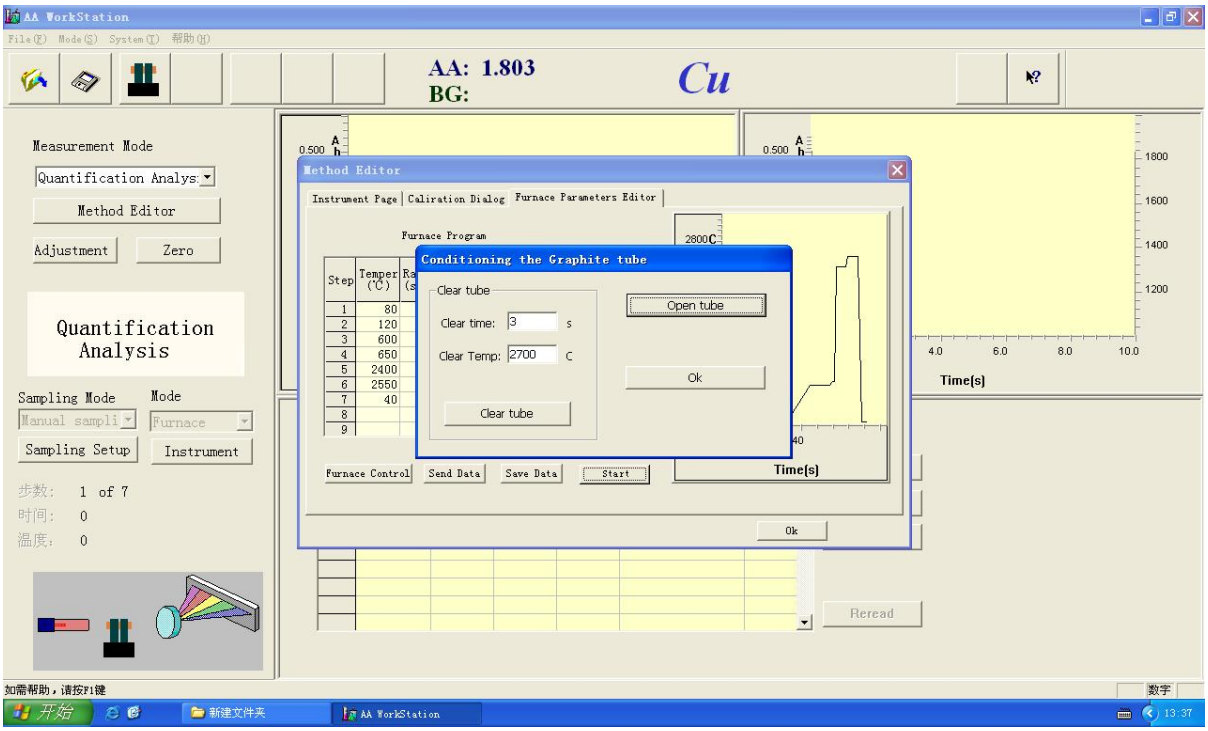


Figure 4-42

8.When the “Clear tube” become bright click it.After cleaning press the “Ok”,close the dialog box.

Align lamps window

Take a copper lamp 1 as a example

1.Press”Adjustment” button,pop up a dialoge box(Figure 4-43)

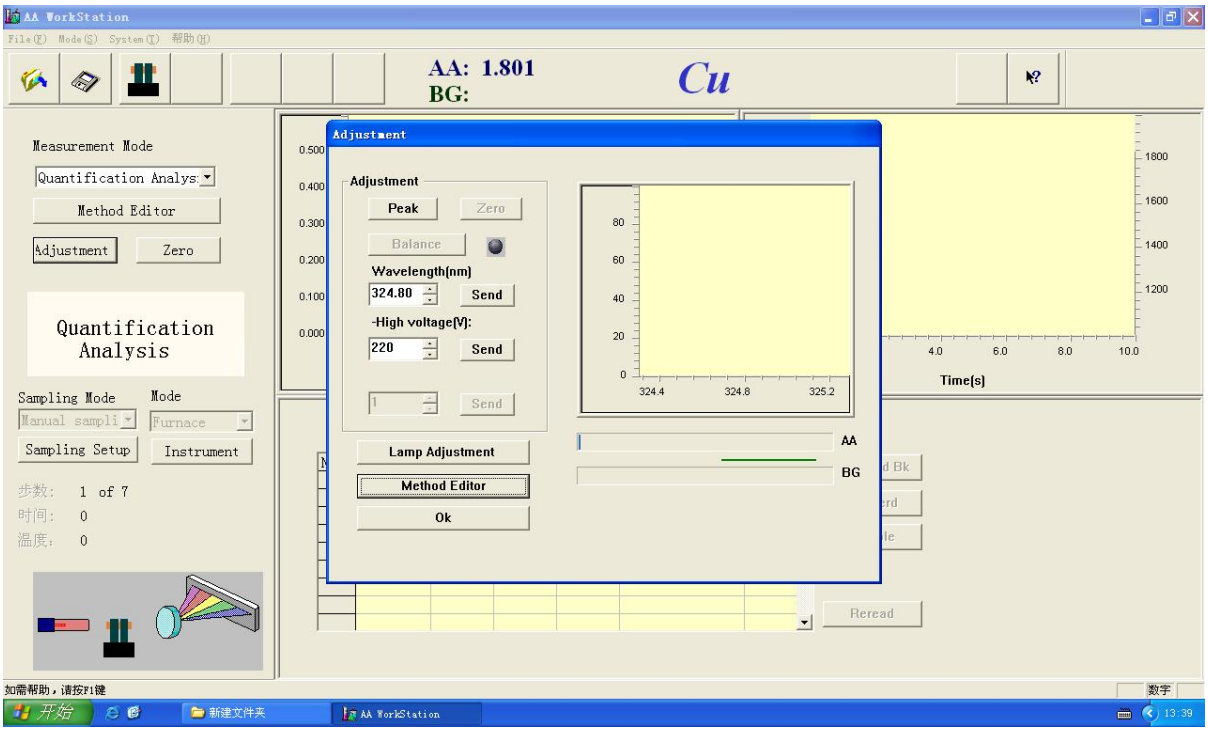


Figure 4-43

2.Press”Method Editor”button into the “Instrument Page”window.

Eg.select”Cu”element, wavelength:324.8nm,-high voltage:200V, current :2.0mA, slit:0.2nm Figure 4-44

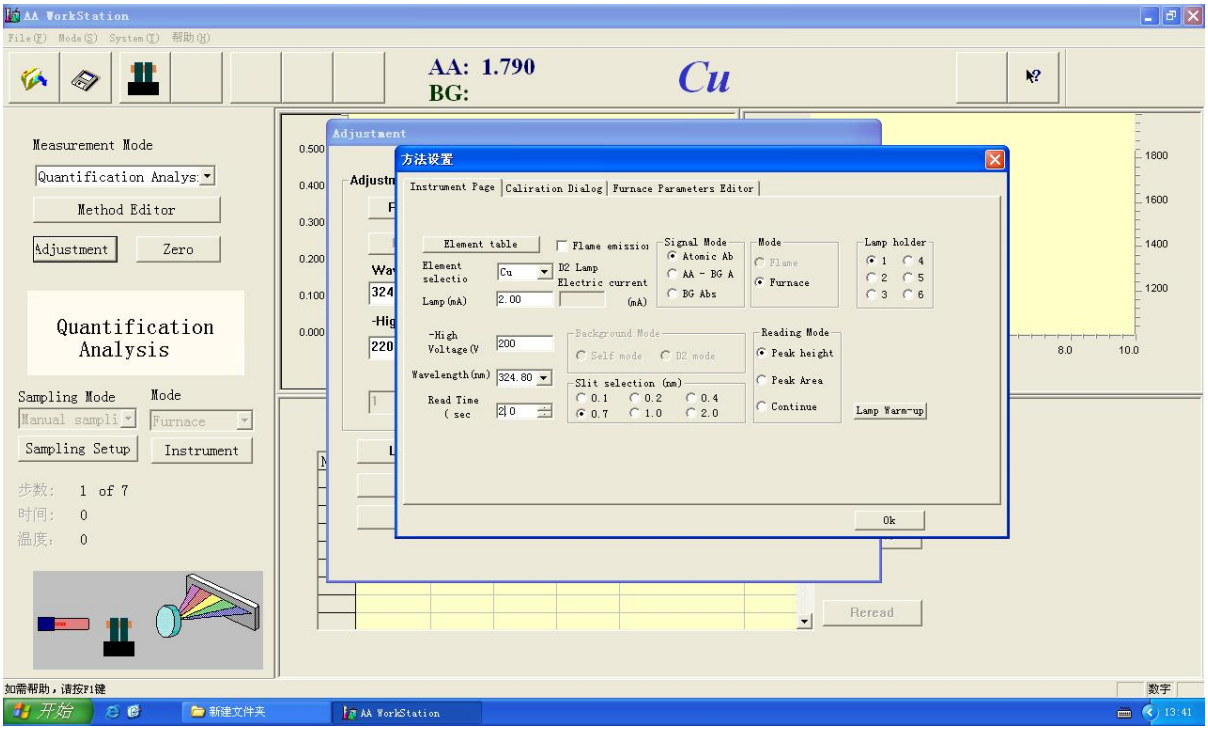


Figure 4-44

c.Press【ok】shows Figure 4-45,press”Peak”button, it will automatically find the center opposition of wavelength

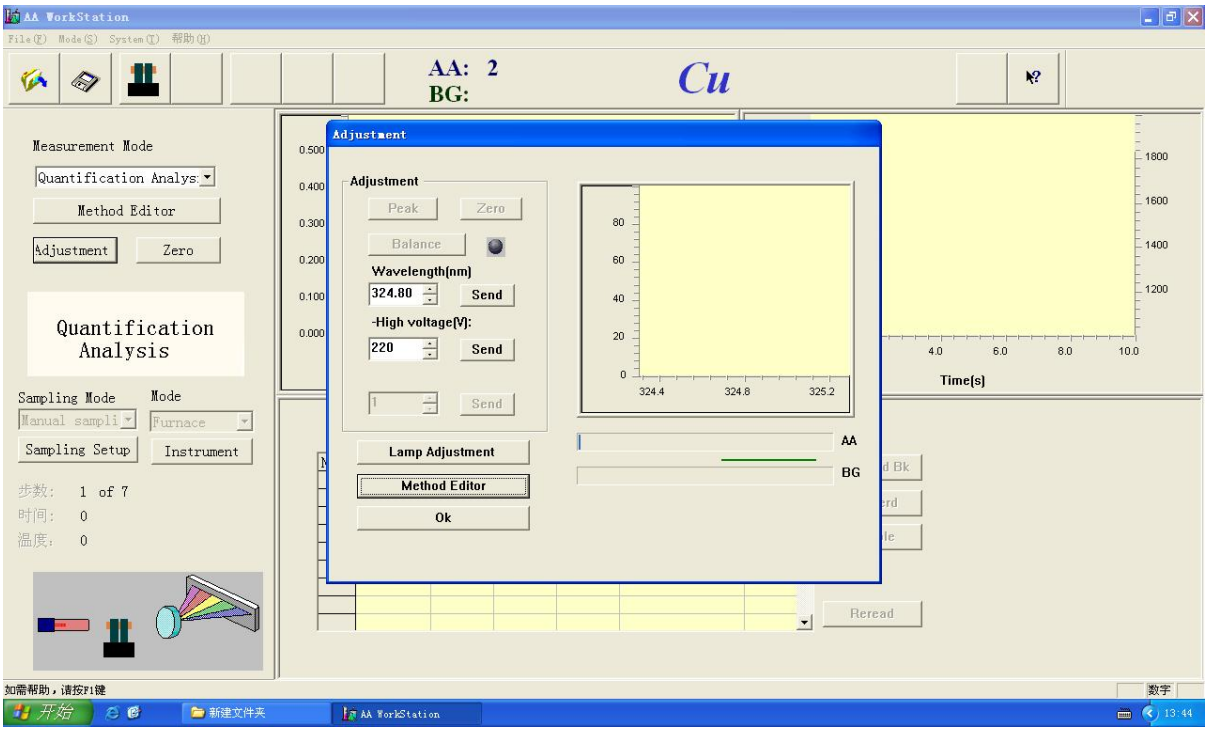


Figure 4-45

High-power Heating Operation

When the ramp=0,high-power heating function can be realized.

Setting the internal flow

Set the internal flow at 1(100ml/min),2(200ml/min) or 3((300ml/min) when some small flow protective gas needed goes through the graphite tube(please set the internal flow at 0 when you do not need it).The function will be needed in the atomization.

NOTICE Small flow will greatly reduce the sensitivity in the atomization.

Setting value of the internal flow	Actual flow(ml/min)
0	0
1	100
2	200
3	300

Injecting sample

Inject sample into the little hole on the graphite tube with a clear 20ul micropipettor covered with nozzle.Keep the nozzle at 5~10mm below the liquid surface,do not touch the wall of the container.Pay attention to slow inhalation and quick injection to prevent any liquid drop from staying at the nozzle and try not to touch the wall of the hole.

Calculating the absolute sensitivity

Preparing standard solution

1. Blank liquid: deionized water(high purity)
2. Standard sample:
   (a) Cu 10ug/L
   (b) Cd 1ug/L

Calculating the absolute sensitivity

Get the best working condition through actual calibration,then get the average absorbance *A*1 through continuously testing the blank liquid for 3 times,get the average absorbance *A*2 through continuously testing the standard sample for 3 times,the actual absorbance is that the average absorbance of the standard sample subtract the average absorbance of the blank liquid,namely

$$A=A2-A1$$

Calculate following the formula:

The absolute sensitivity(A.S)=$C \times H \times 0.0044$(g)

C----- concentration of the standard solution(g/uL)

H-----sample quantity(uL)

A-----average absorbance of the standard solution

Calculative result should be less than,

Cd: 1×10^{-12} g

Cu: 1×10^{-11} g

Chapter 5　Performing Analyses

Reading Abs

The method of reading Abs only can be used in testing sample's absorbance under some condition.If you want to test the concentration of some element you must use straight line or curve or other calibration method of single-point quantitative analysis.

Take the Cu lamp 1 as an example

NOTICE　Usually the time of integration should be longer than the time of atomization

1.Aligning lamps(see "Aligning lamps")

2. Input the appropriate 'Read Time" value in the "Instrument Page" window (Figure 5-1a)

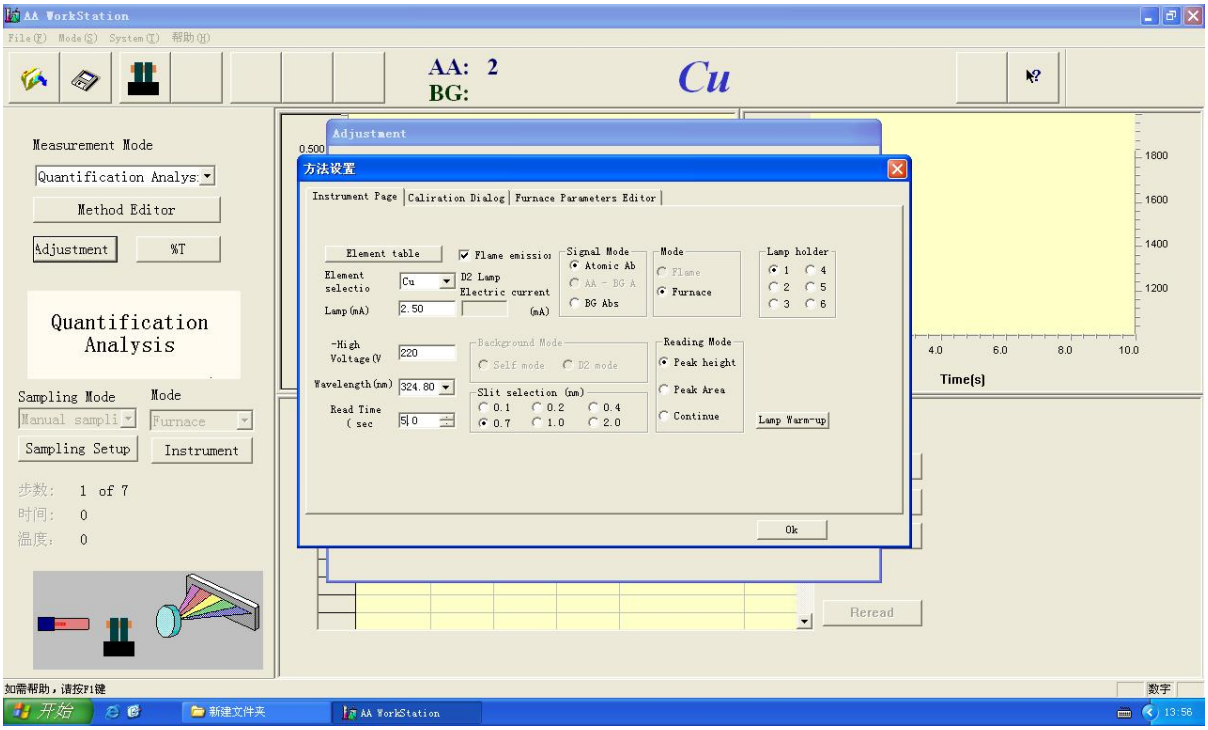


Figure 5-1a

3.Select "Quantification Analysis" in the "Measurement Mode" (Figure 5-1b)

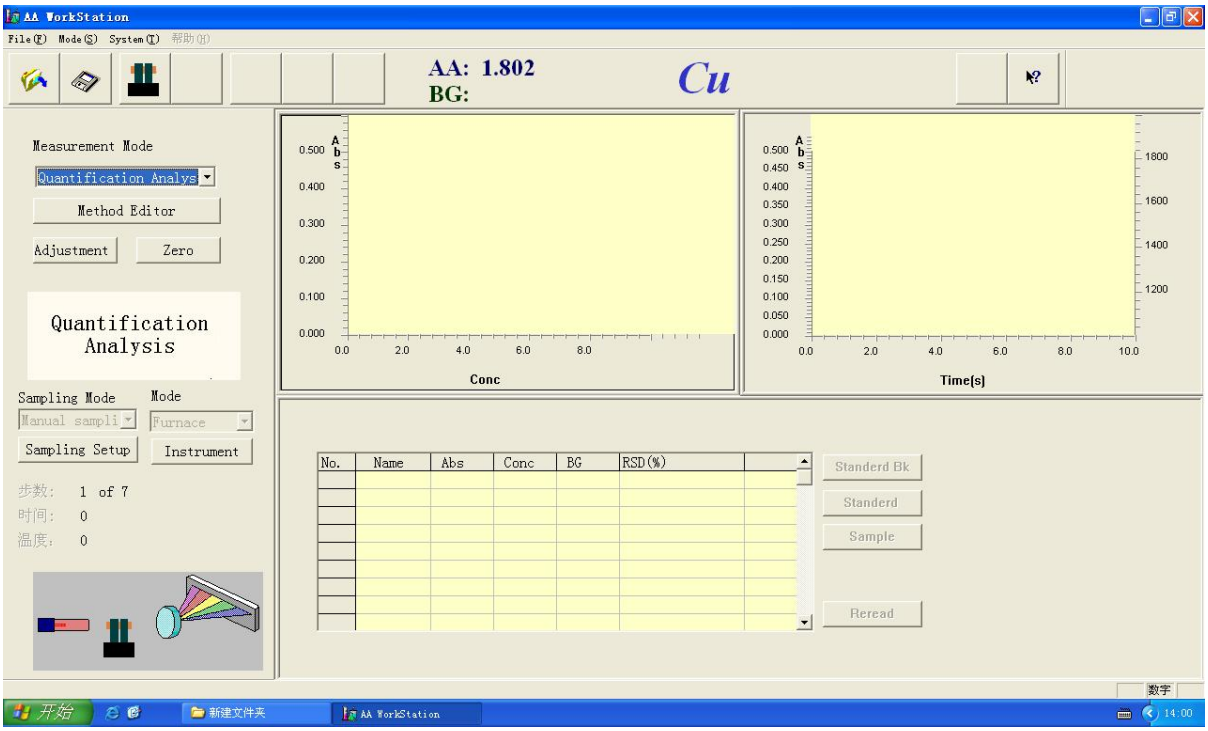


Figure 5-1b

4. Press【Method Editor】,open"Calibration Dialoge"window (Figure 5-2)

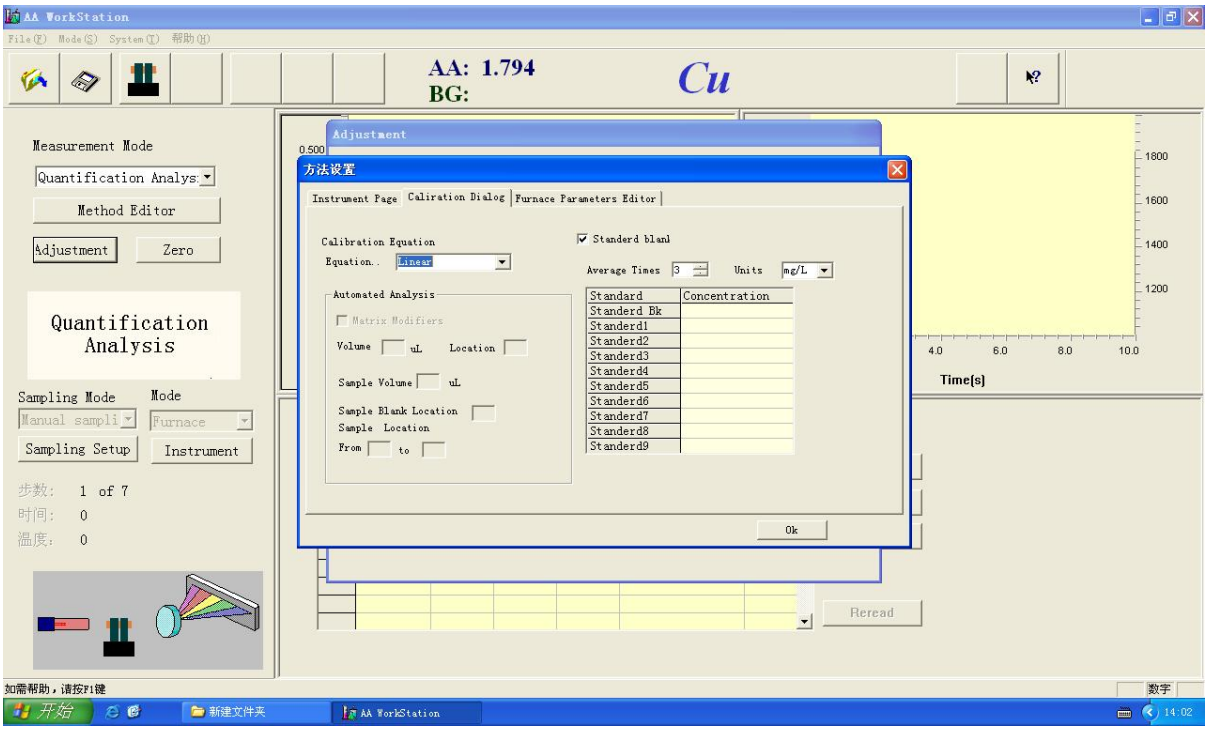


Figure 5-2

5.Select the "Read Abs"in the "Calibration Equation"(Figure 5-3)

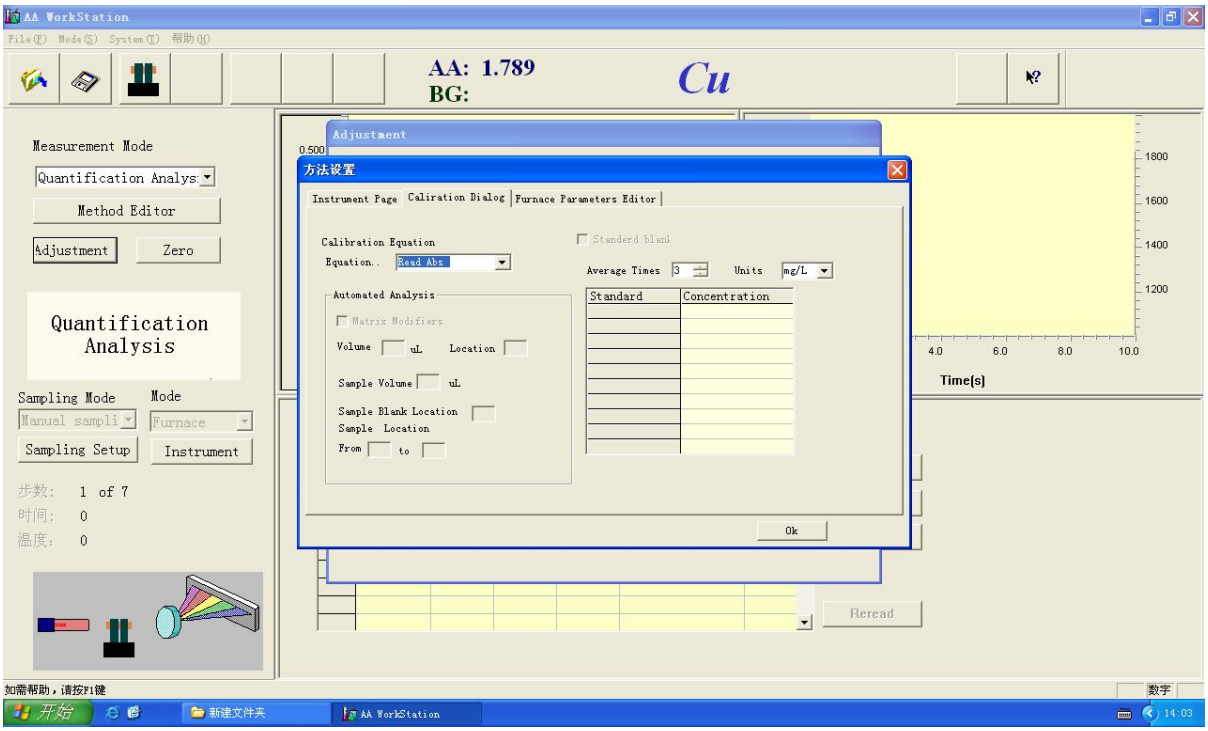

AA WorkStation
AA: 1.789
BG:
Cu
Measurement Mode
Quantification Analys
Method Editor
Adjustment
Zero
Quantification Analysis
Sampling Mode
Mode
Manual sampli
Furnace
Sampling Setup
Instrument
步数: 1 of 7
时间: 0
温度: 0
Adjustment
方法设置
Instrument Page
Caliration Dialog
Furnace Parameters Editor
Calibration Equation
Equation..
Read Abs
Standerd bland
Average Times
Units
mg/L
Automated Analysis
Matrix Modifiers
Volume
uL
Location
Sample Volume
uL
Sample Blank Location
Sample Location
From
to
Standard
Concentration
Ok
Reread
Time[s]
如需帮助，请按F1键
数字
开始
新建文件夹
AA WorkStation

Figure 5-3

6.Press【OK】button to close the dialoge box,"Sample" button brighten(Figure 5-4)

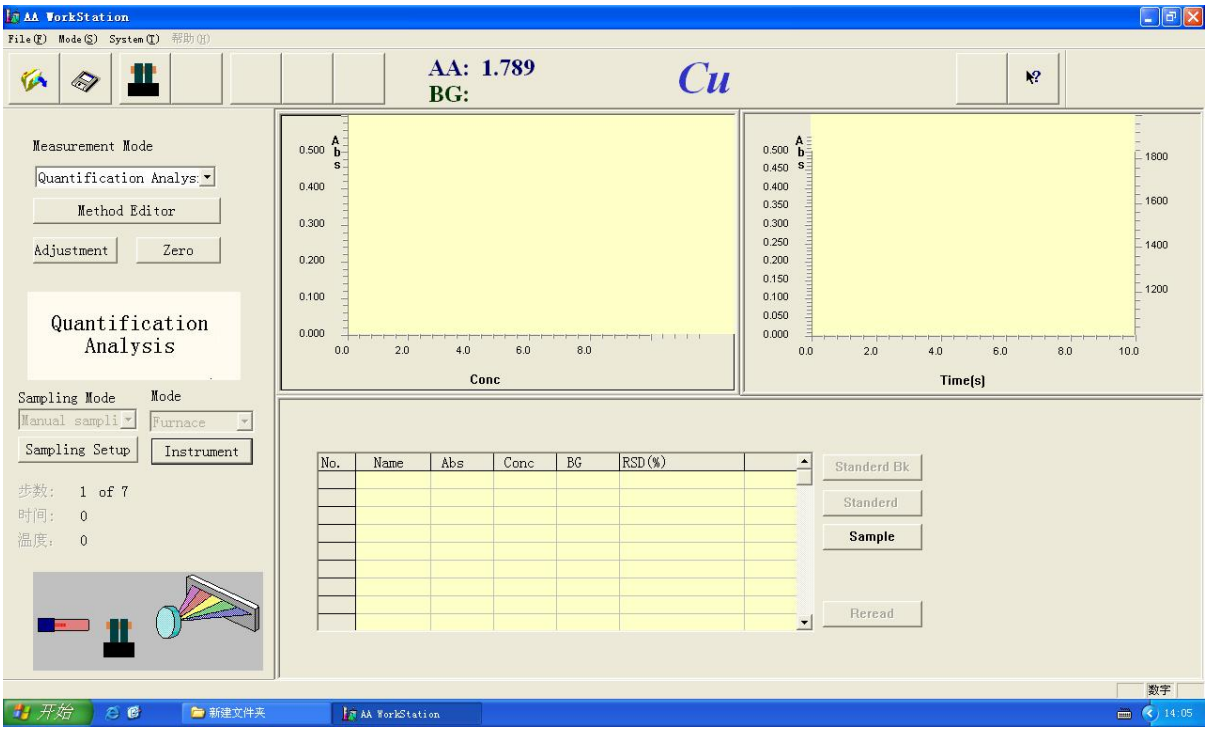


Figure 5-4

7.Press【Instrument】(Figure 5-4),"Furnace Parameters Editor" is displayed,see Figure 5-5

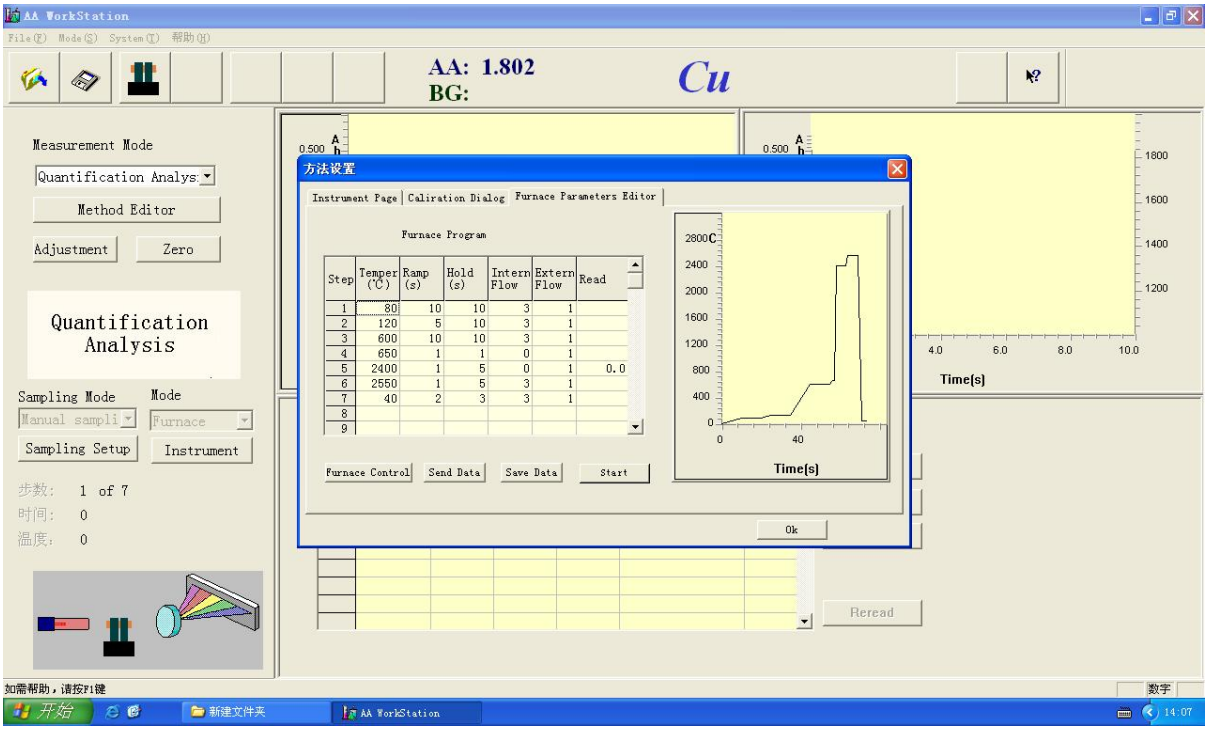


Figure 5-5

8. Input the program,such as input the No.1 program,see Figure 5-6

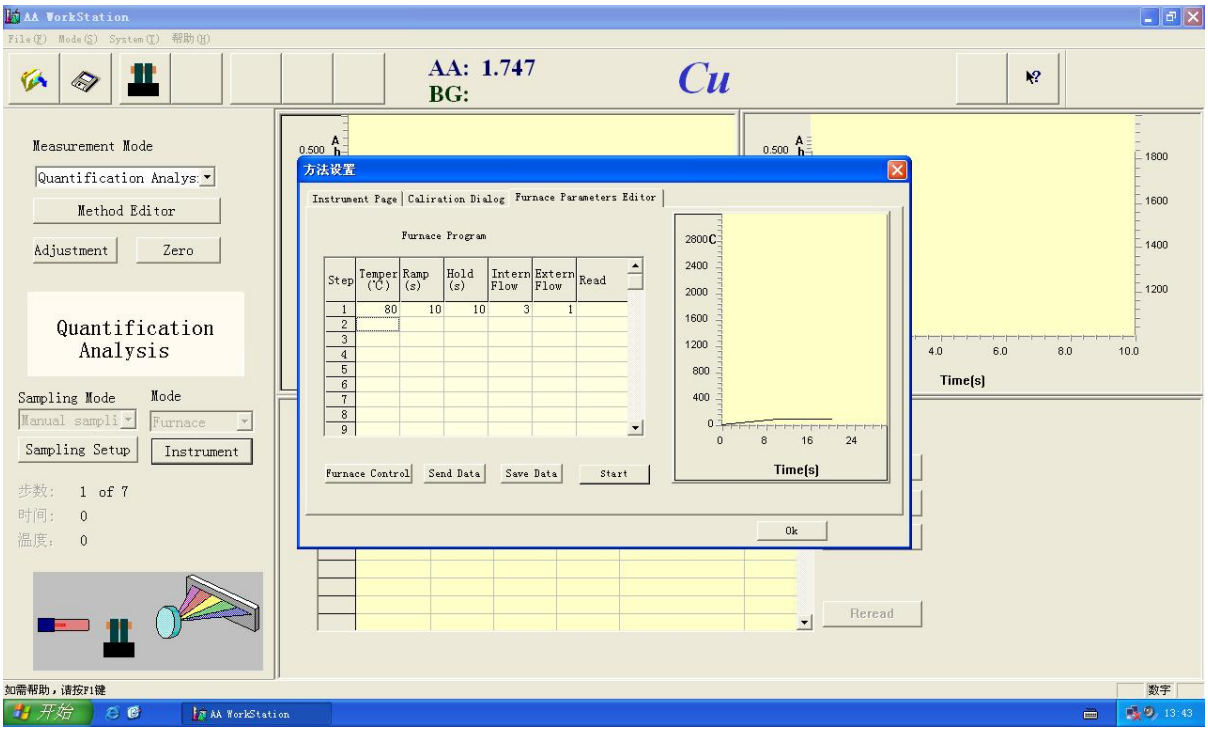


Figure 5-6

9.Input the No.2 program,see Figure 5-7

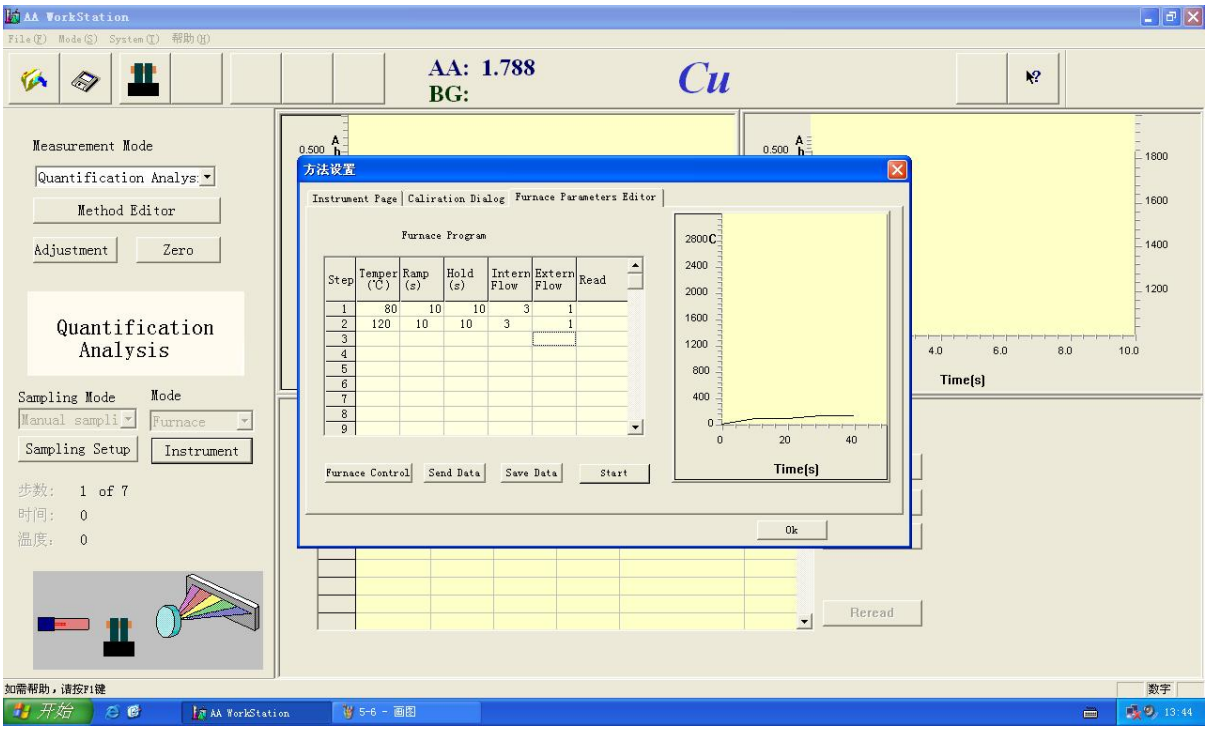


Figure 5-7

10. By analogy, input the corresponding program as shown in figure 5-8 (Note:at most 19 can be input)

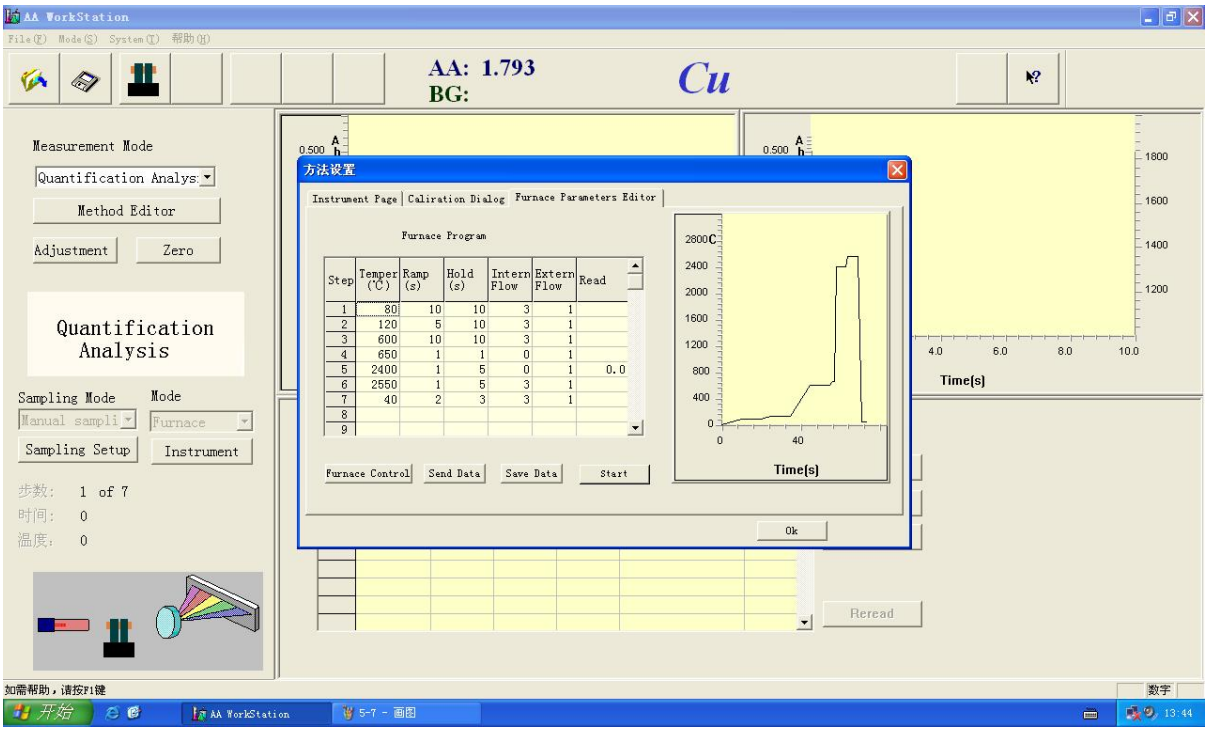


Figure 5-8

11.If you want to alter the programs have been input,please press the right button of the mouse and you can delete or insert,etc.for the detailed information you can see the【Chapter 4】"Furnace Parameters Editor".

12.After setting up press the "Send Data" to send the program to the instrument,press the "Save Data" to save the program.

13.Press the "Start" Figure 5-9a pops up.(If close the "Furnace Parameters Editor" window,press the "Sample",it pops up as well).

NOTICE When to need maximum power heating press the "Start" when powering the instrument on or press the "Start" when you change the condition of the atomization,Figure 5-9a dialog box pops up,press the "Ok" to start the automatically calibrating temperature,see Figure 5-9b.When it ends up Figure 5-9b automatically disappears, warning tone of "du" will sounds,then you can test sample now.

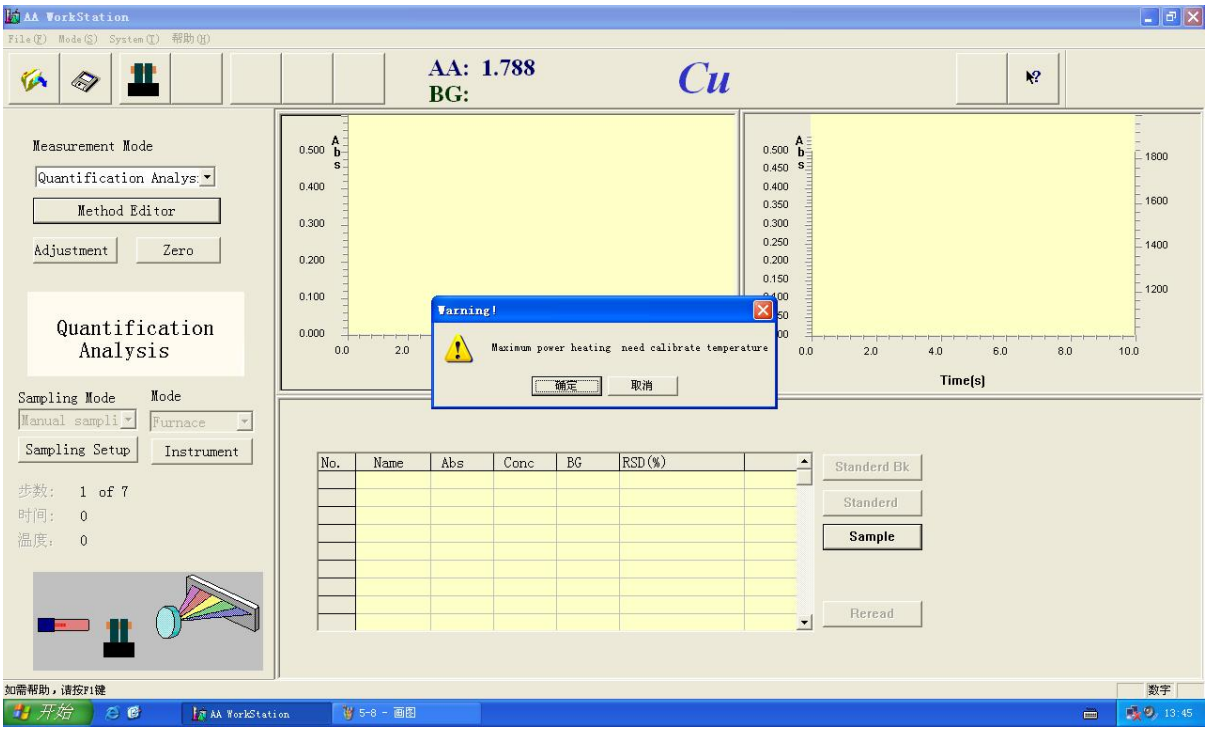


Figure 5-9a

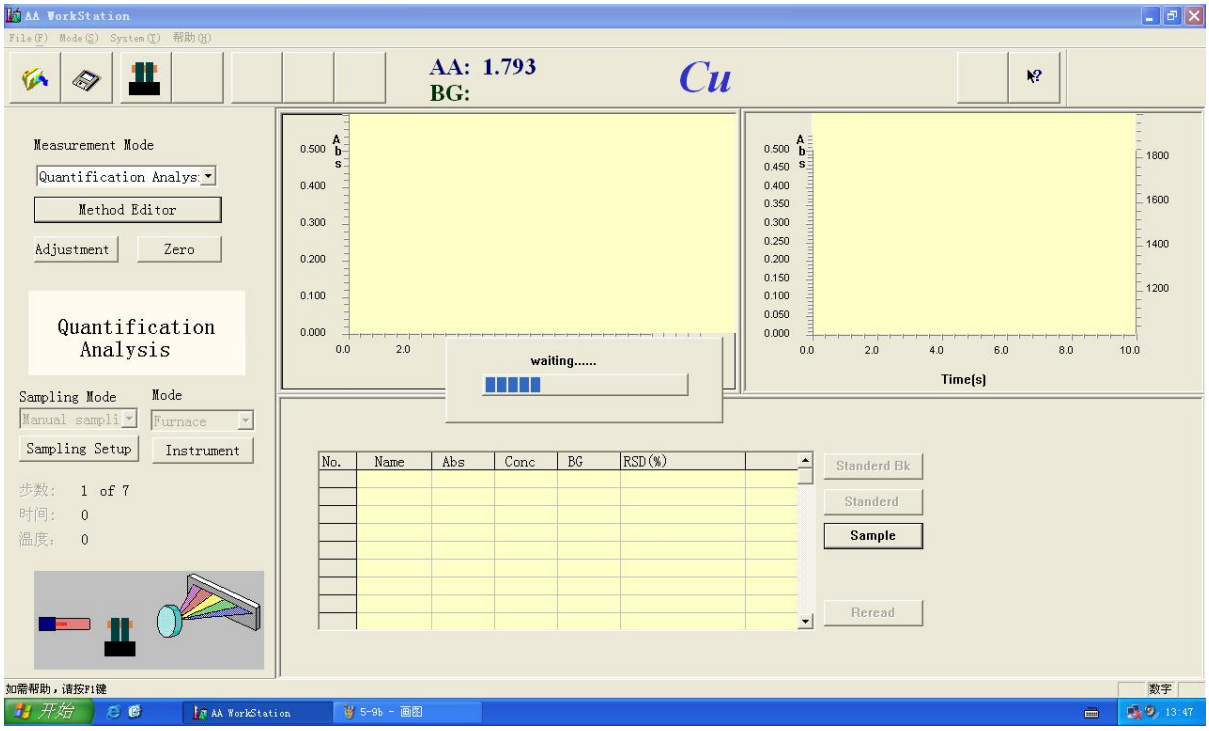


Figure 5-9b

14.Please sampling after automatically calibrating temperature.Press “Start”,Figure 5-10 dialog box pops up(If close the ”Furnace Parameters Editor” window,press the “Sample”,it pops up as well).”All” and “Section” are optional,if you select the “All”,press “Start” to start heating.

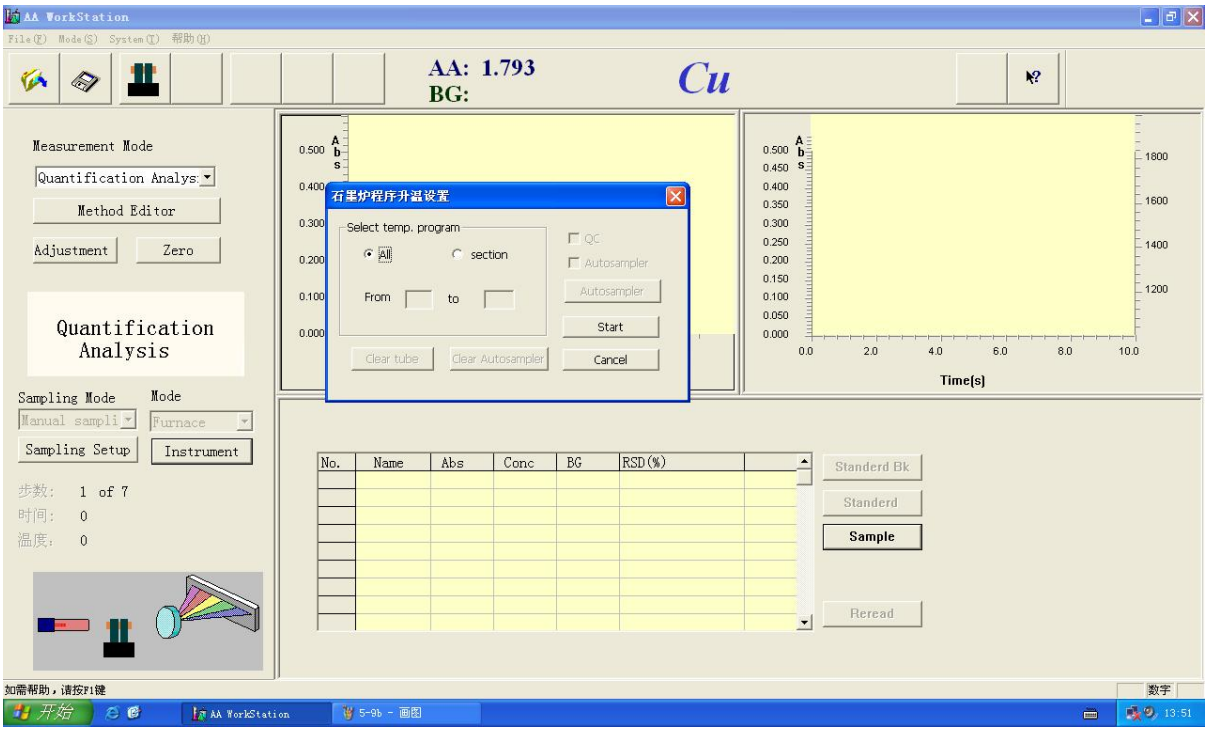


Figure 5-10

15.At this time,the “Start” change into “Stop”(Figure 5-11)

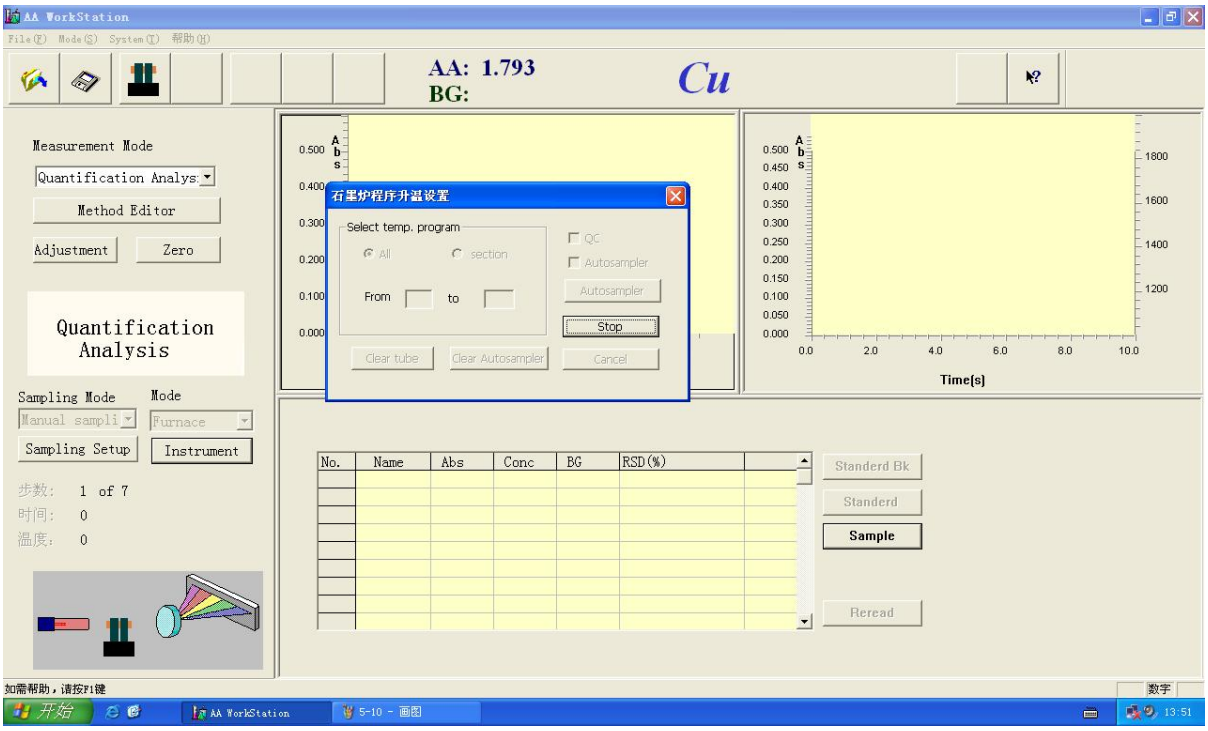


Figure 5-11

16.The heating procedure will be real-time displayed in the lower left of the operating interface.After the heating absorbance value will be displayed(Figure 5-12)

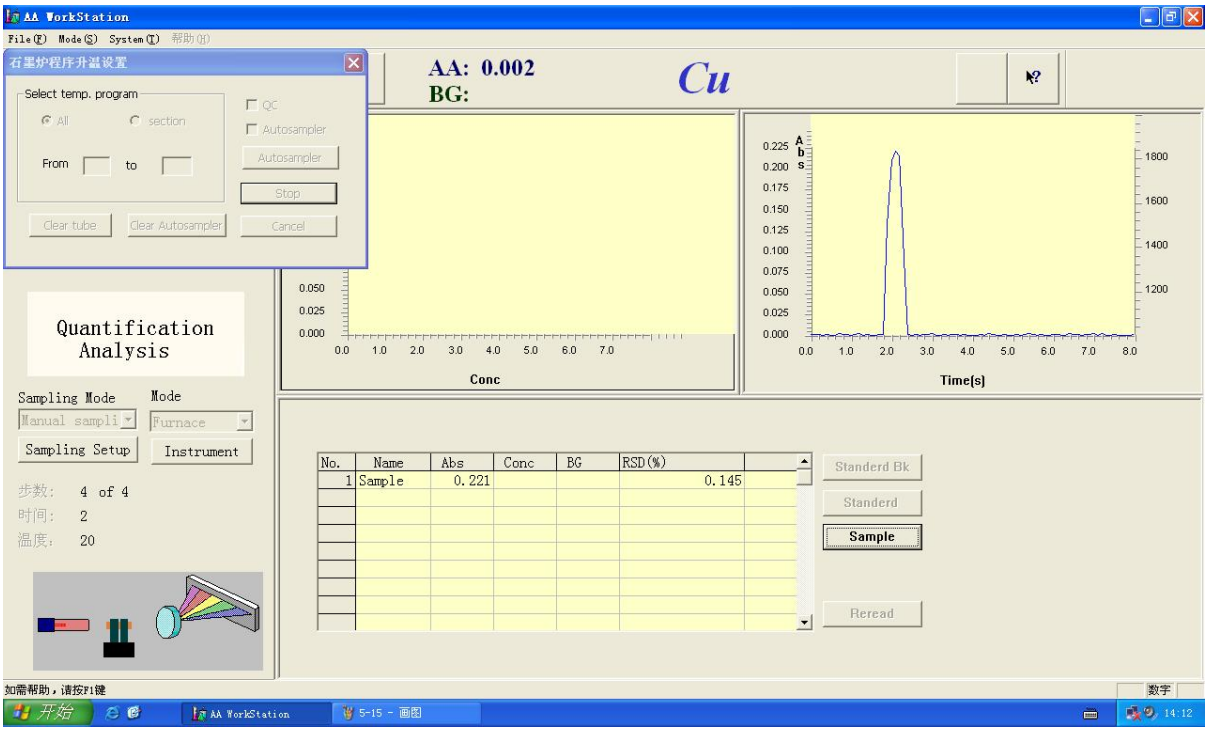


Figure 5-12

17.When the furnace cools warning tone of “du” will sounds,the “Stop”change into “Start”,Figure 5-13.

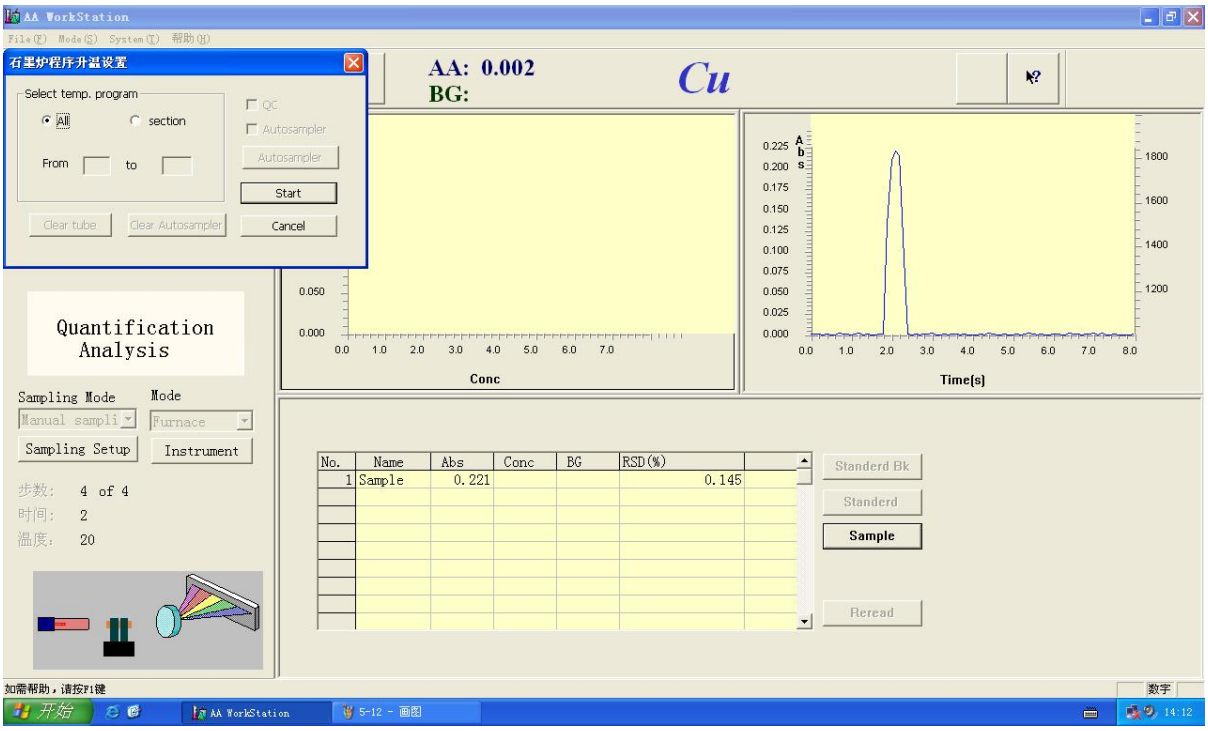


Figure 5-13

18. Press【Sample】again,start the second sampling

19. In the same way start the third heating,Figure 5-14

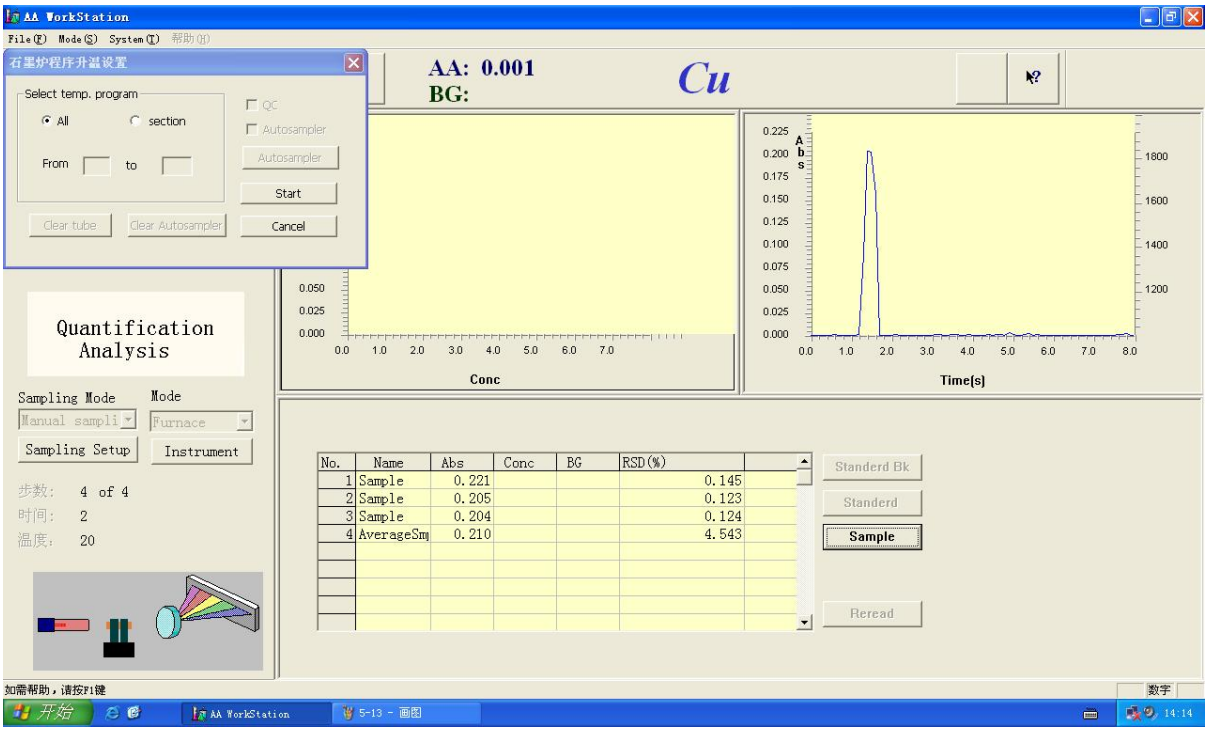


Figure 5-14

20. You can repeatedly do the sample testing for several times according to your need

21. If you aren't satisfied with the measurement result or want to amend the sample name in Figure 5-14 you can test again or amend the sample name.The detailed method see the "Rereading and changing the name of the sample"

22.You can save and print the data after testing sample

Linear Calibration

Linear method is the most commonly standard curve method used in quantitative analysis, suitable for element sample's quantitative analysis which standard curve is good linear

Take Cu lamp 1 as an example

1. Aligning lamps.see" Aligning lamps"

2. Input the appropriate"Read Time" in the "Instrument Page",select appropriate "Reading Mode" (Figure 5-15a)

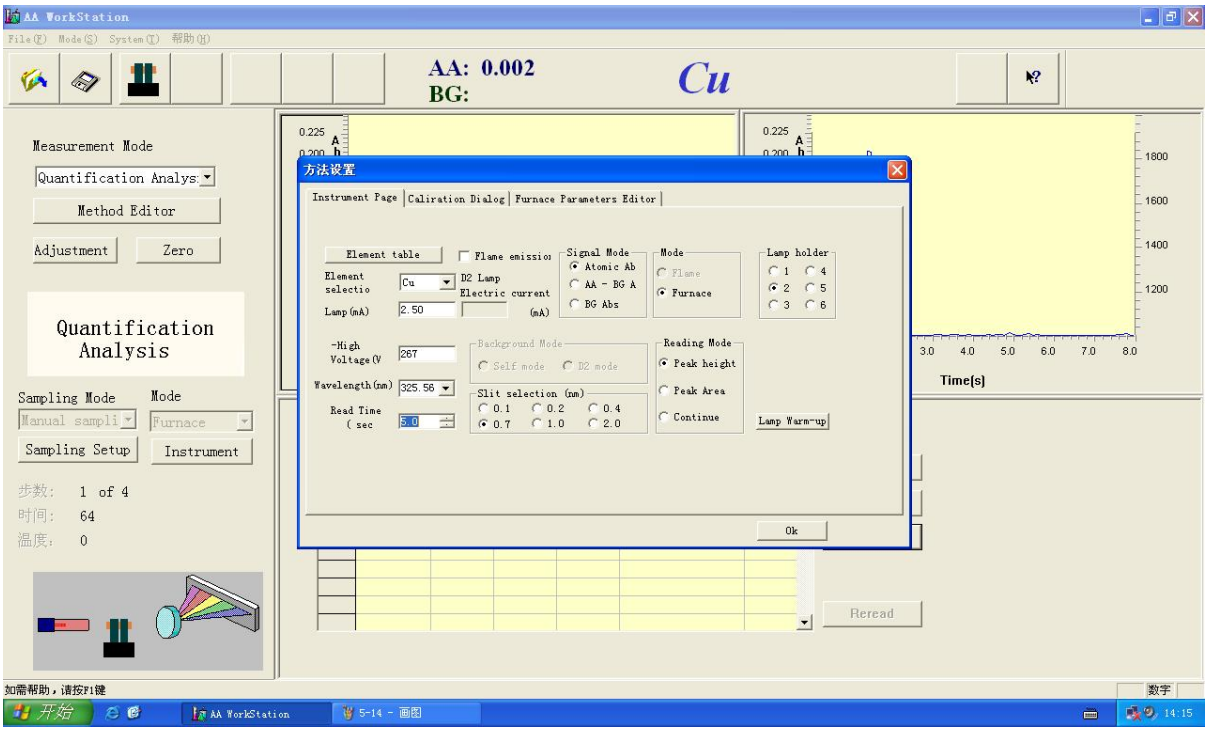


Figure 5-15a

3. Figure 5-15b, select the “quantification analysis” from the “Measurement Mode”

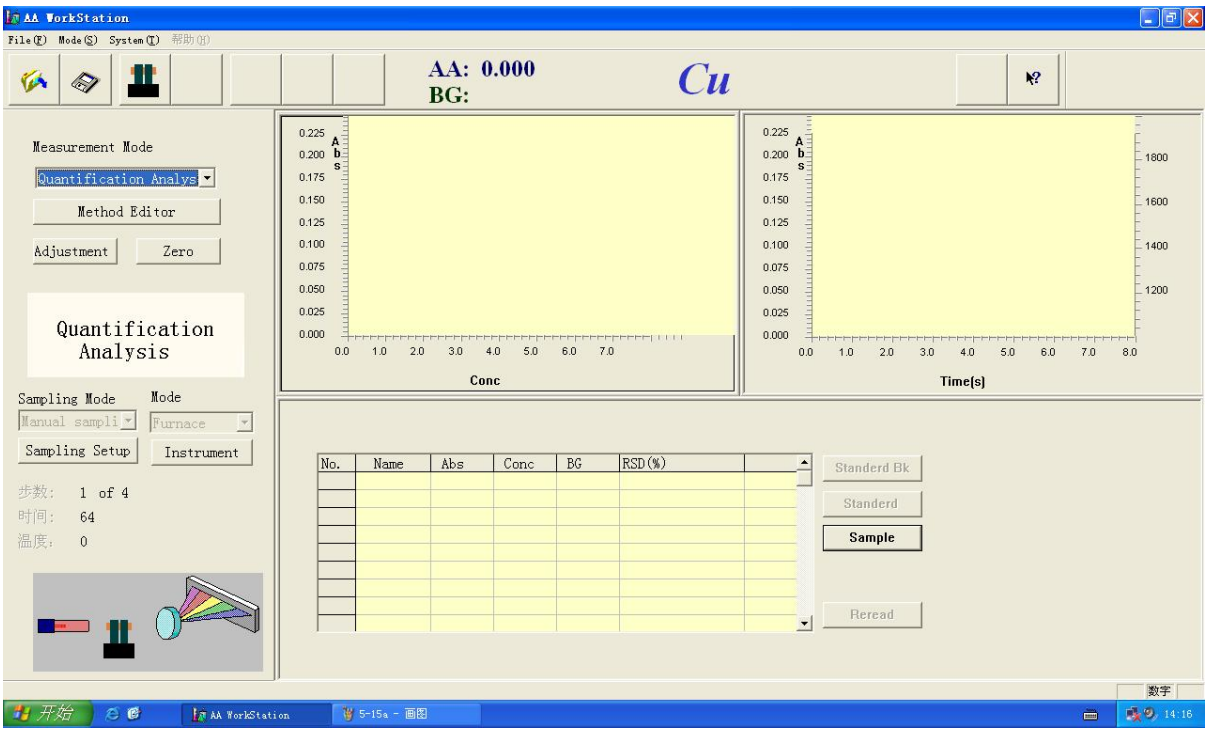


Figure 5-15b

4.Press【Method Editor】,open the “Calibration Dialoge”window(Figure 5-15)

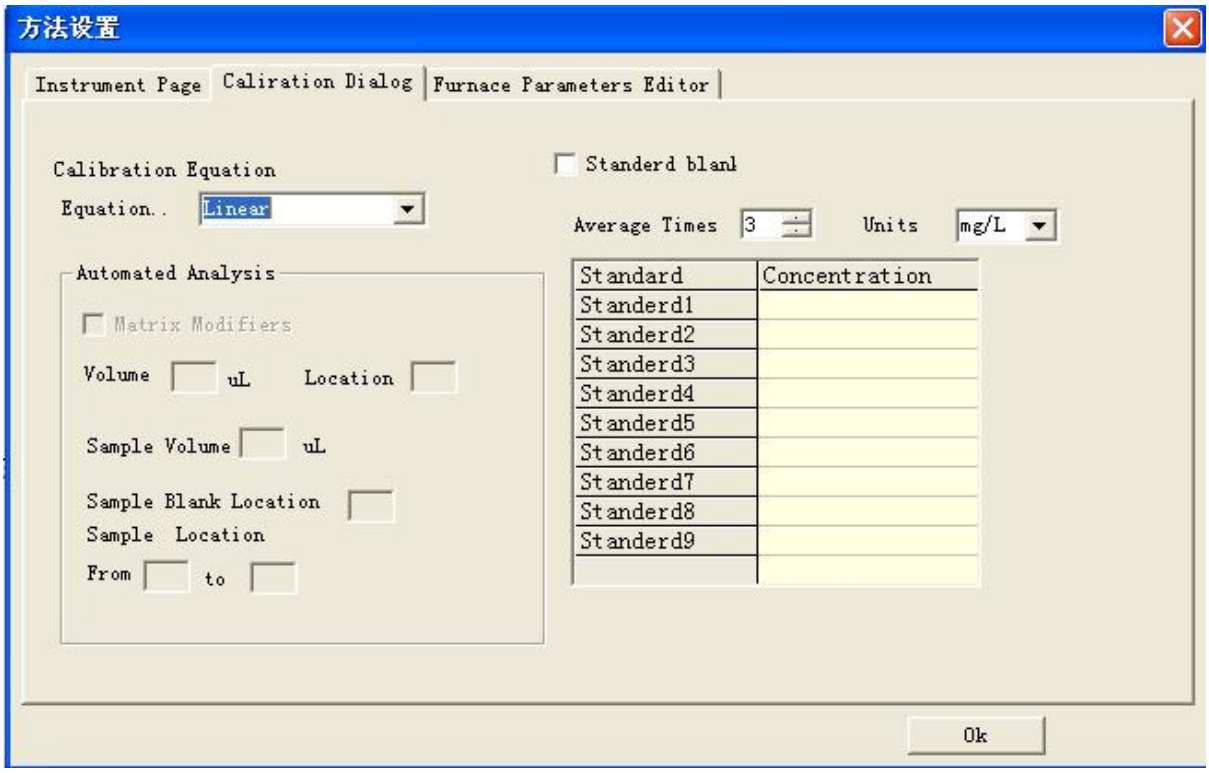


Figure 5-15

5..Select the “Linear”in the “Calibration Equation”,figure 5-16(notice:at least input 2 standard samples

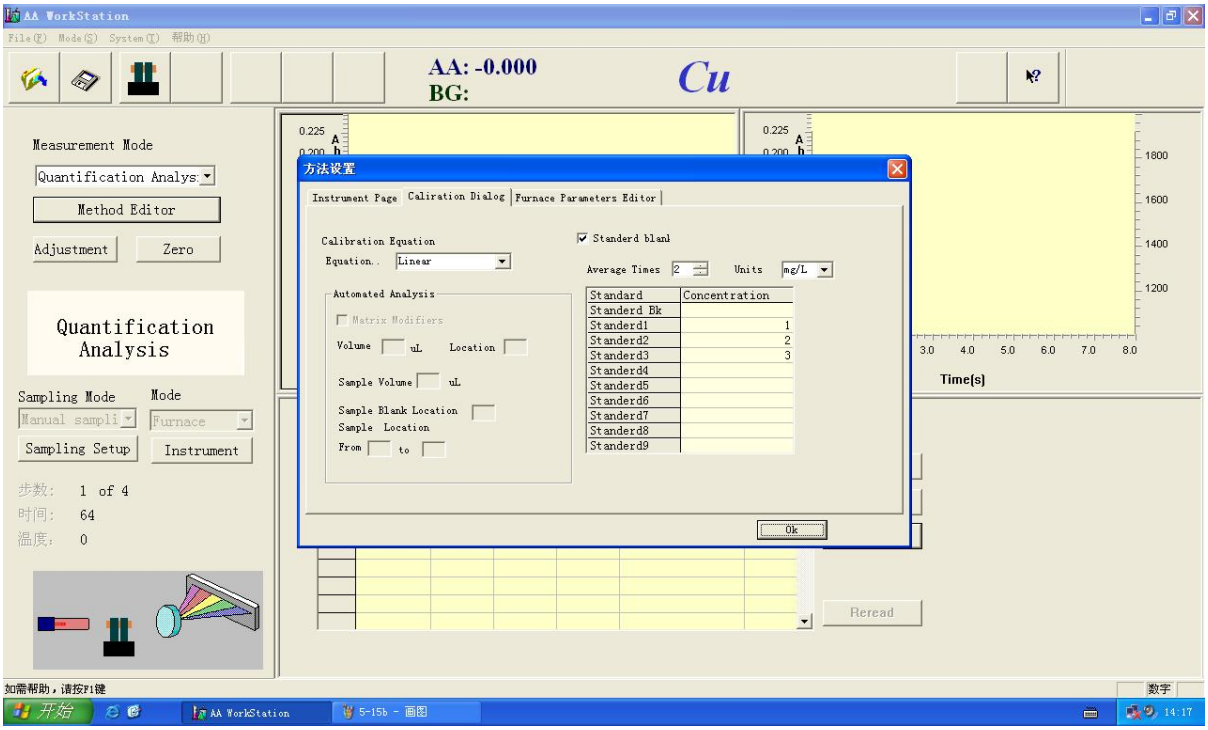


Figure 5-16

6. Press【OK】,close the dialoge box,”Standard Bk”brighten.figure5-17

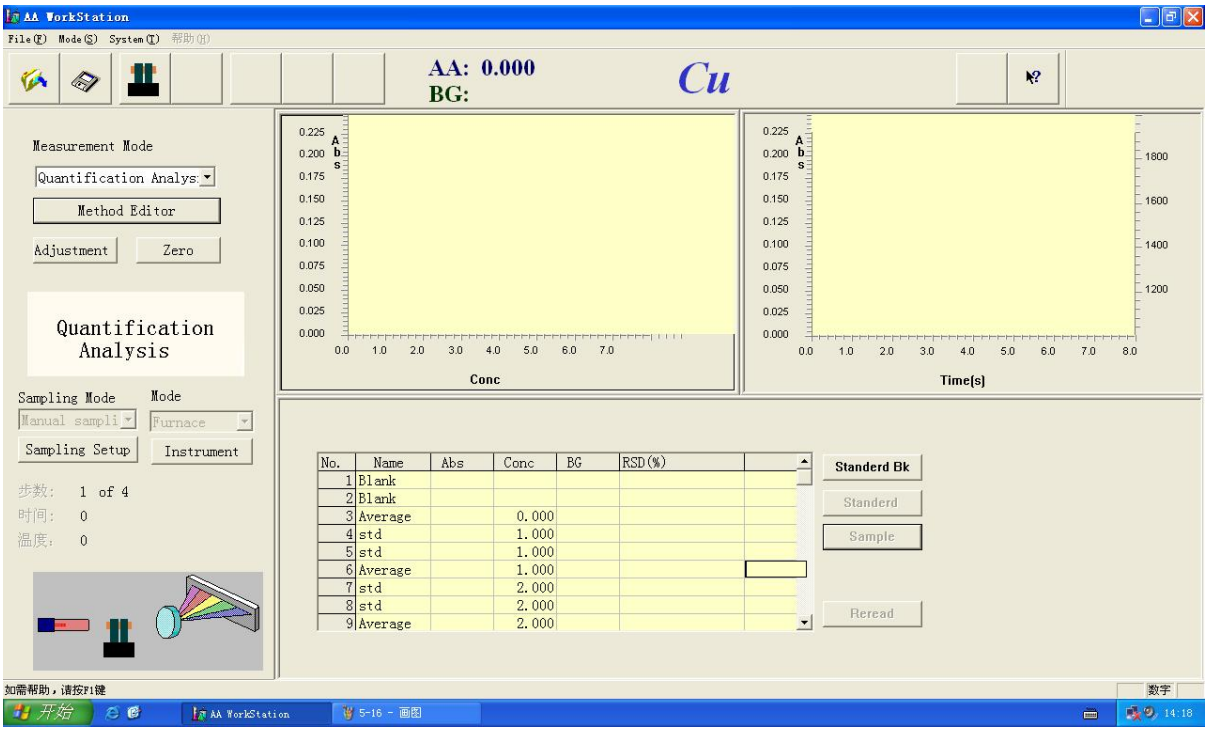


Figure 5-17

NOTICE: If the standard blank and sample blank are not the same systematic substance you must do the blank calibration

If the concentration of the standard blank sample is different with the concentration of the distilled water,select the"Standard BK"

7. Press【Instrument】(Figure 5-17),"Furnace Parameters Editor" is displayed,see Figure 5-18

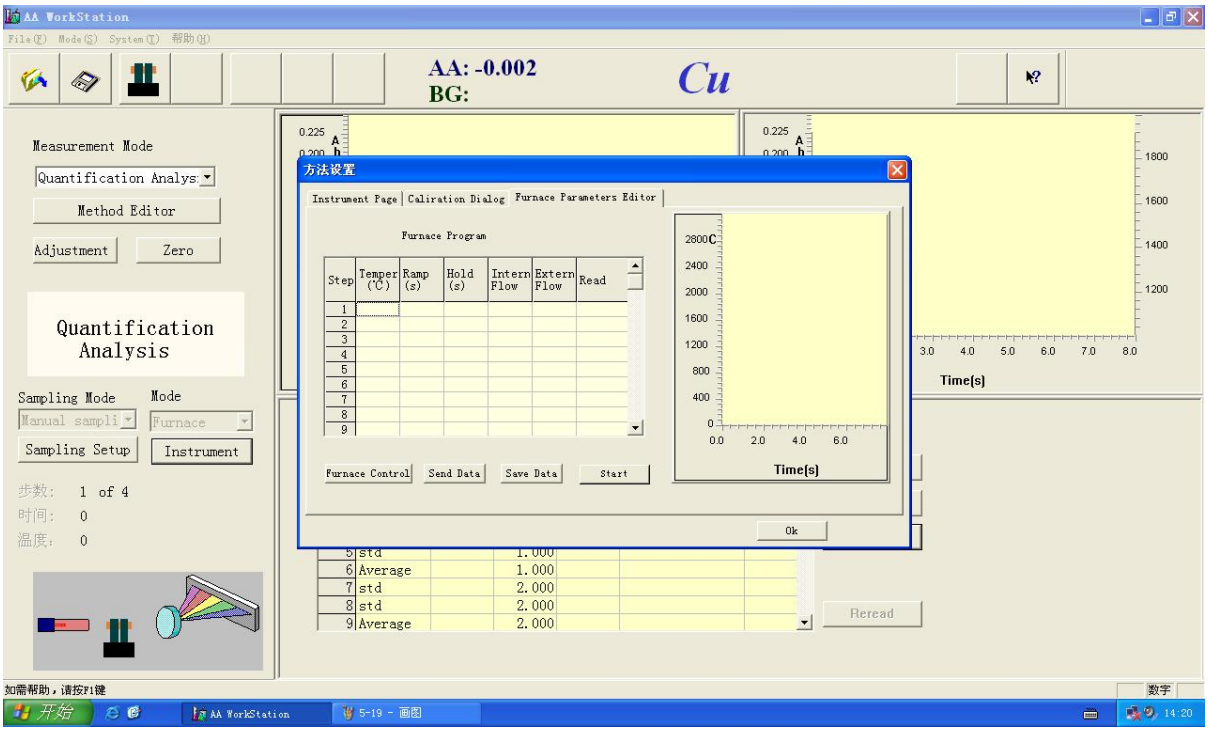


Figure 5-18

8. Input the program,such as input the No.1 program,see Figure 5-19

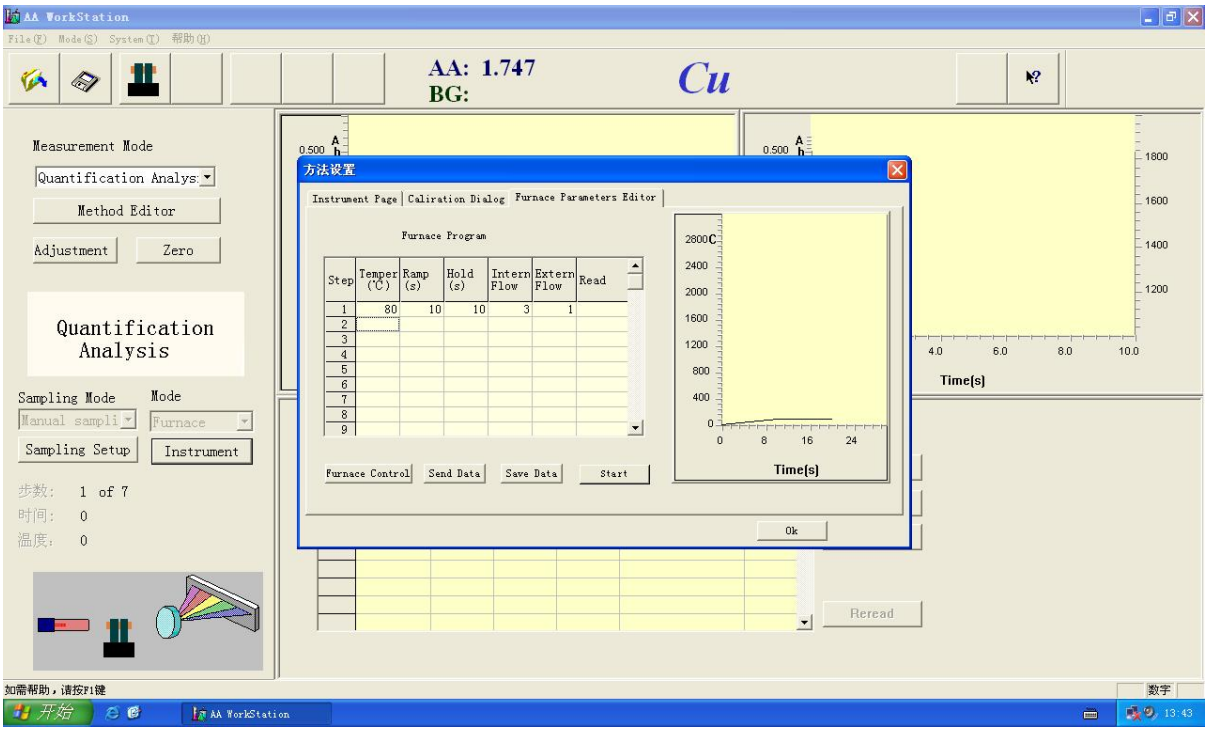


Figure 5-19

9. Input the No.2 program,see Figure 5-20

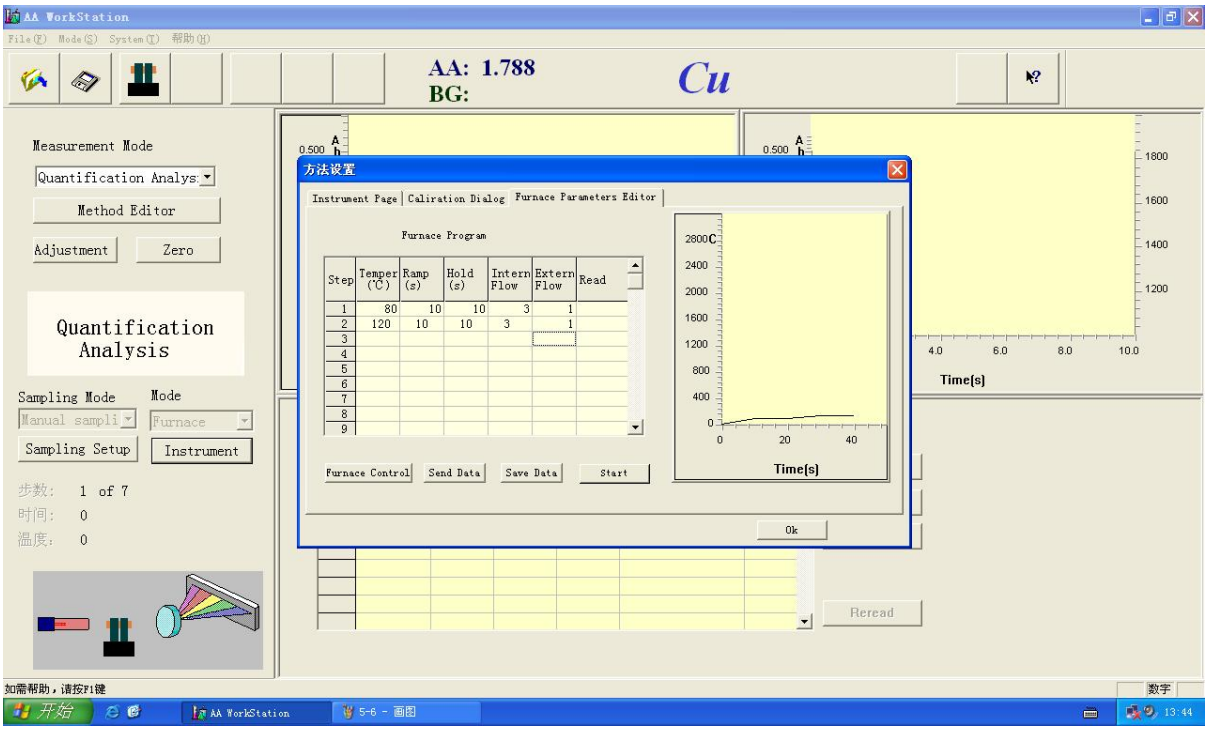


Figure 5-20

10. By analogy, input the corresponding program as shown in figure 5-21 (Note:at most 19 can be input)

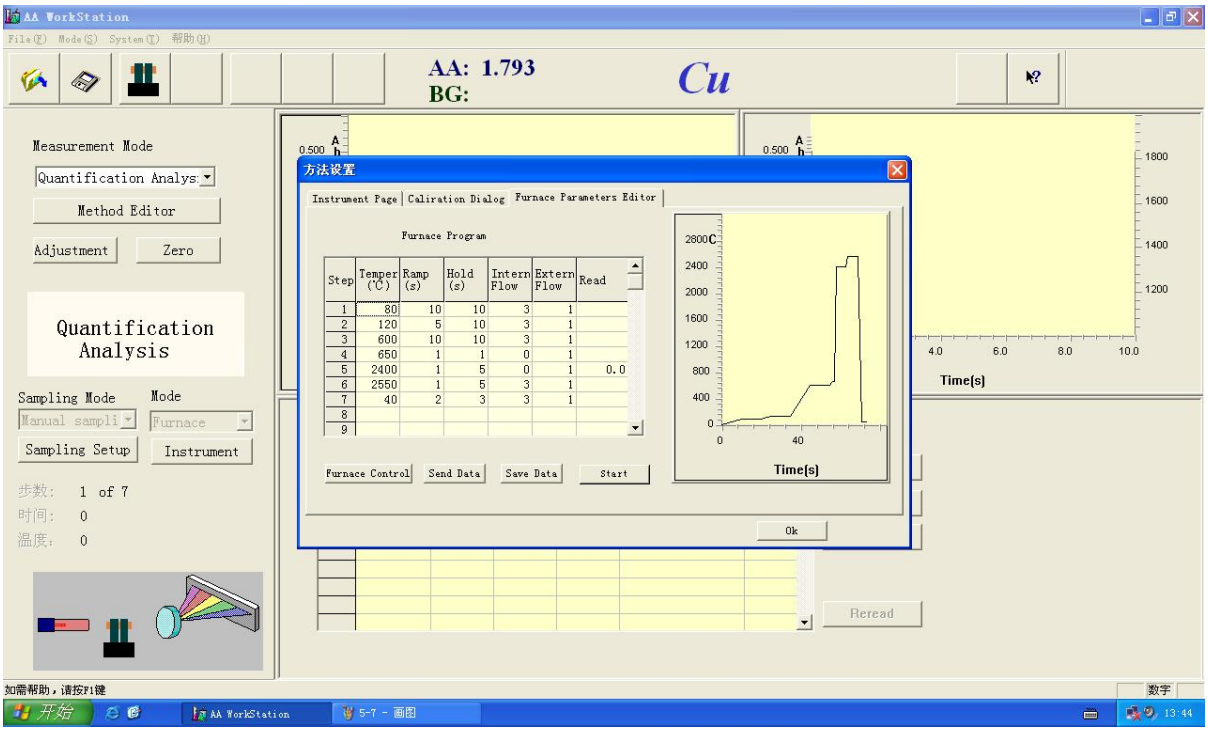


Figure 5-21

11.If you want to alter the programs have been input,please press the right button of the mouse and you can delete or insert,etc.for the detailed information you can see the【Chapter 4】"Furnace Parameters Editor".

12.After setting up press the "Send Data" to send the program to the instrument,press the "Save Data" to save the program.

13.Press the "Start" Figure 5-9a pops up.(If close the "Furnace Parameters Editor" window,press the "Standard BK",it pops up as well).

NOTICE When to need maximum power heating press the "Start" when powering the instrument on or press the "Start" when you change the condition of the atomization,Figure 5-22a dialog box pops up,press the "Ok" to start the automatically calibrating temperature,see Figure 5-22b.When it ends up Figure 5-22b automatically disappears, warning tone of "du" will sounds,then you can test sample now.

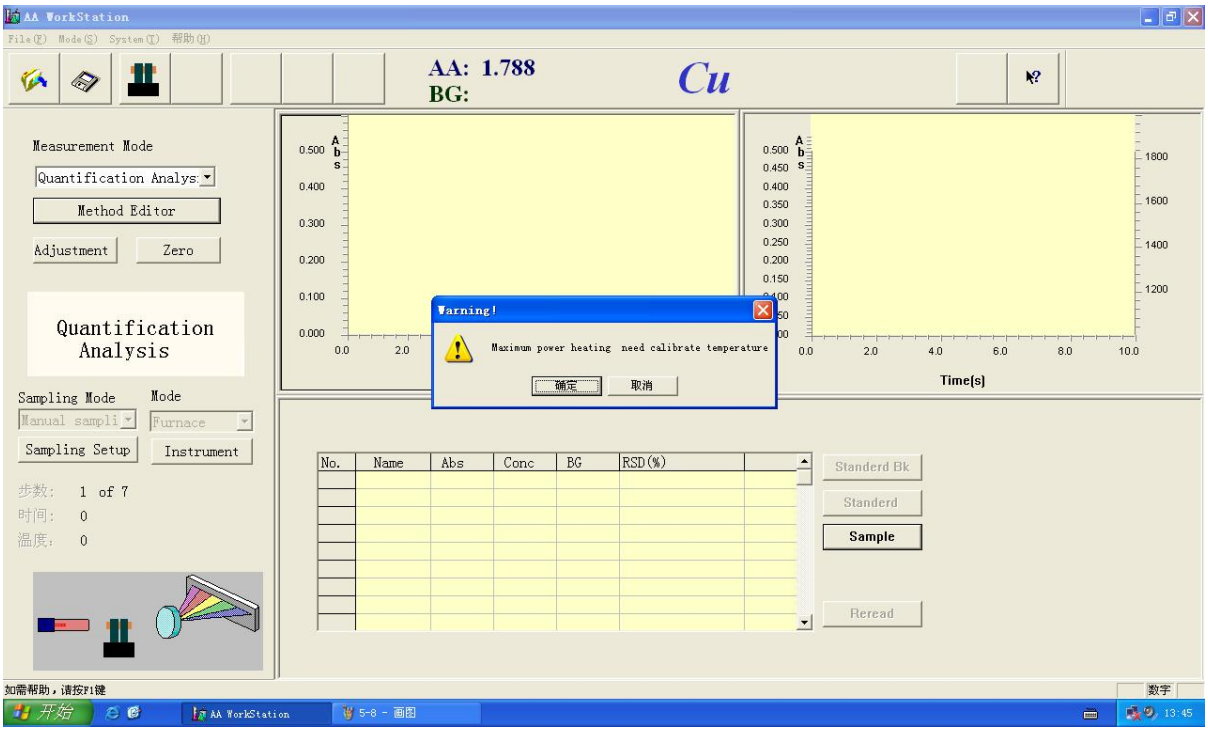


Figure 5-22a

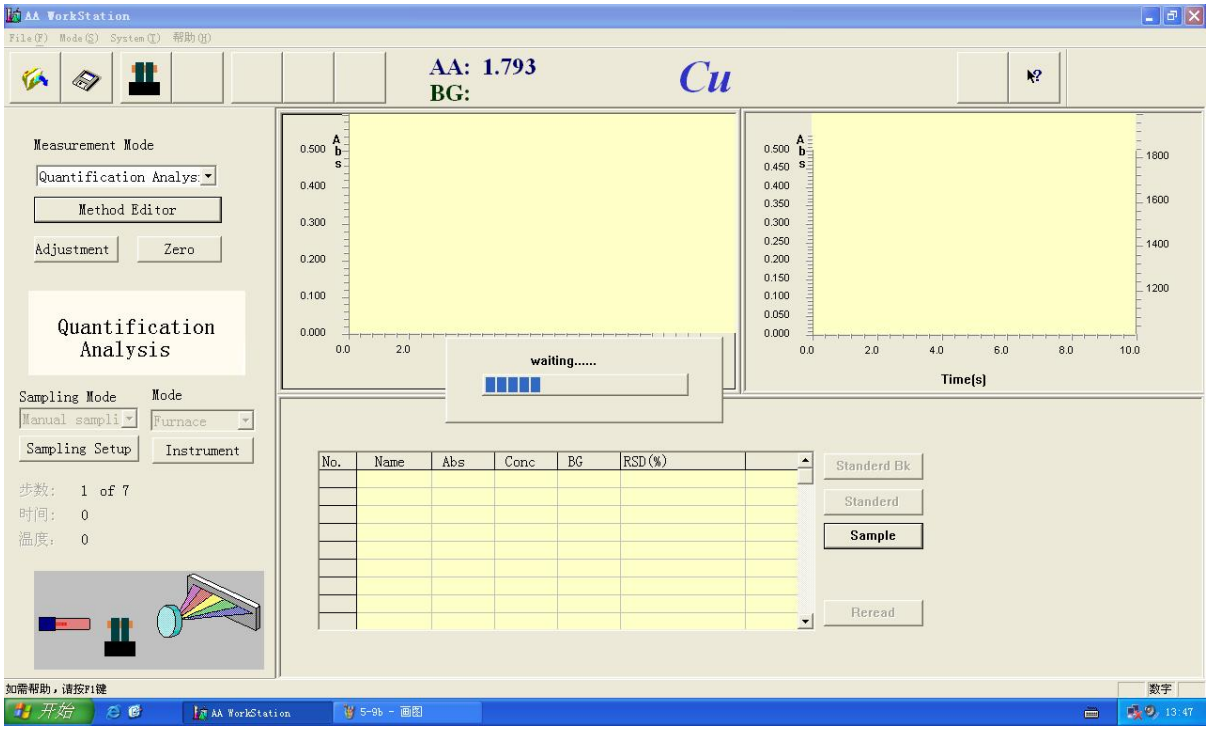


Figure 5-22b

14. Please sampling after automatically calibrating temperature.Press “Start”,Figure 5-22 dialog box pops up(If close the ”Furnace Parameters Editor” window,press the “Standard BK”,Figure 5-23 pops up

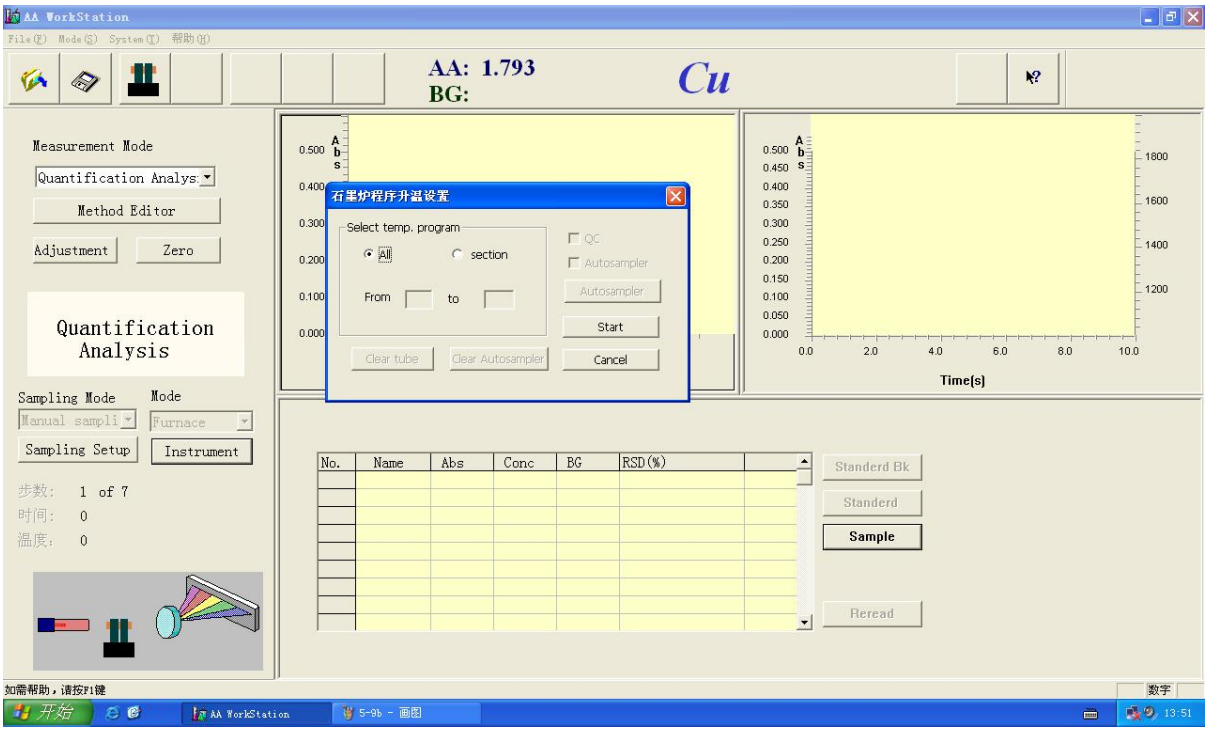


Figure 5-23

15. Select the “All” in the Figure 5-23 dialog box,press “Start” to start heating.At this time,the “Start” change into “Stop”(Figure 5-24)

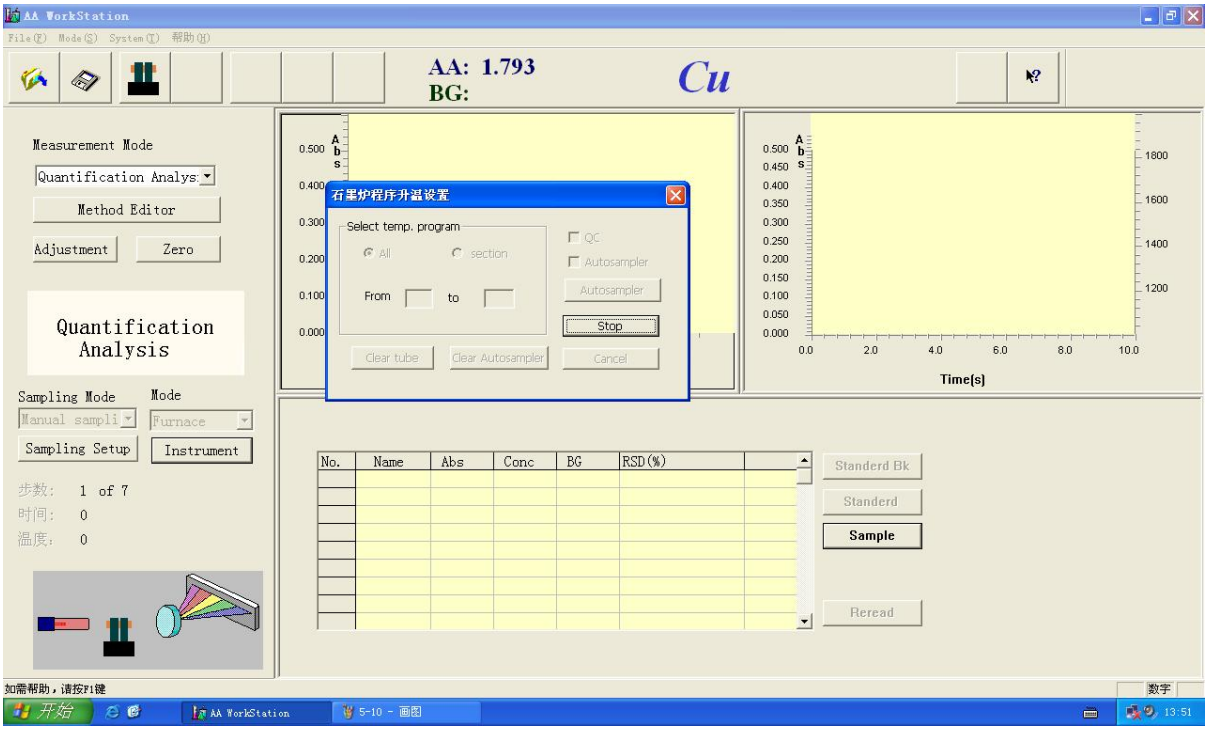


Figure 5-24

16. The heating procedure will be real-time displayed in the lower left of the operating interface.After the heating a collection of illustrative plates and data will be displayed(Figure 5-25)

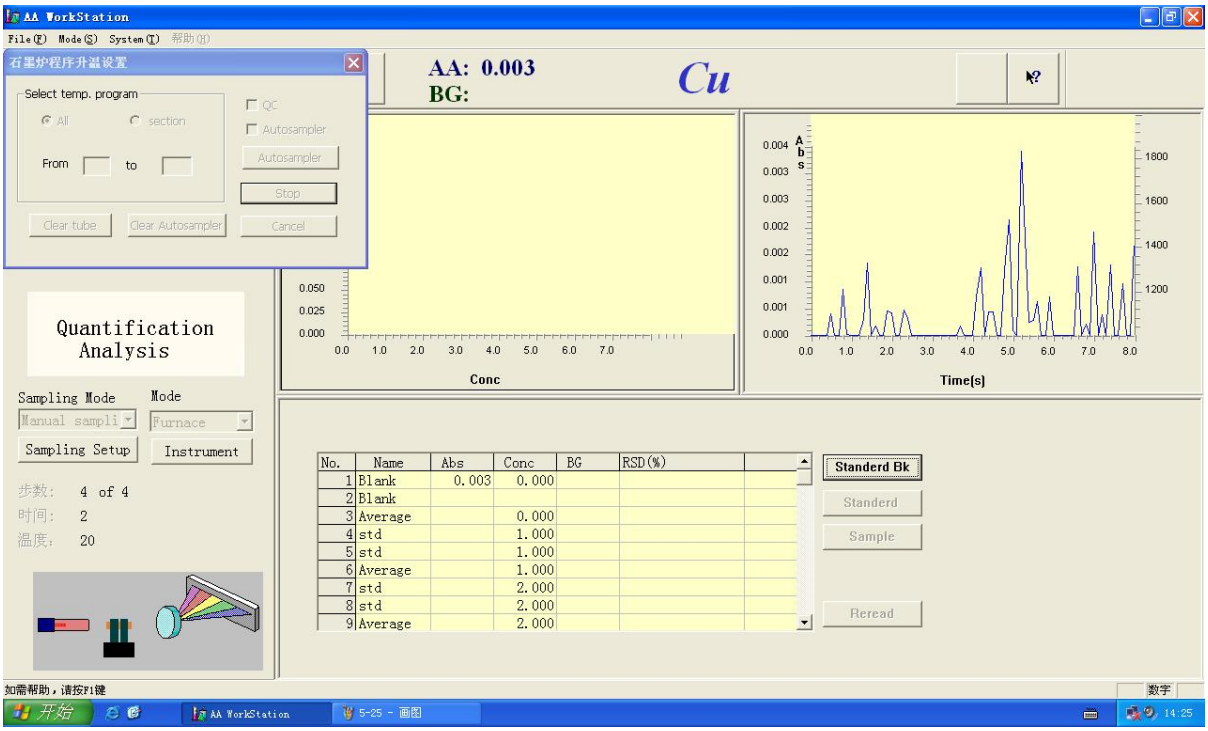


Figure 5-25

17. When the furnace cools warning tone of “du” will sounds,the “Stop”change into “Start”

18. Press【Start】again,start the second sampling,Figure 5-26

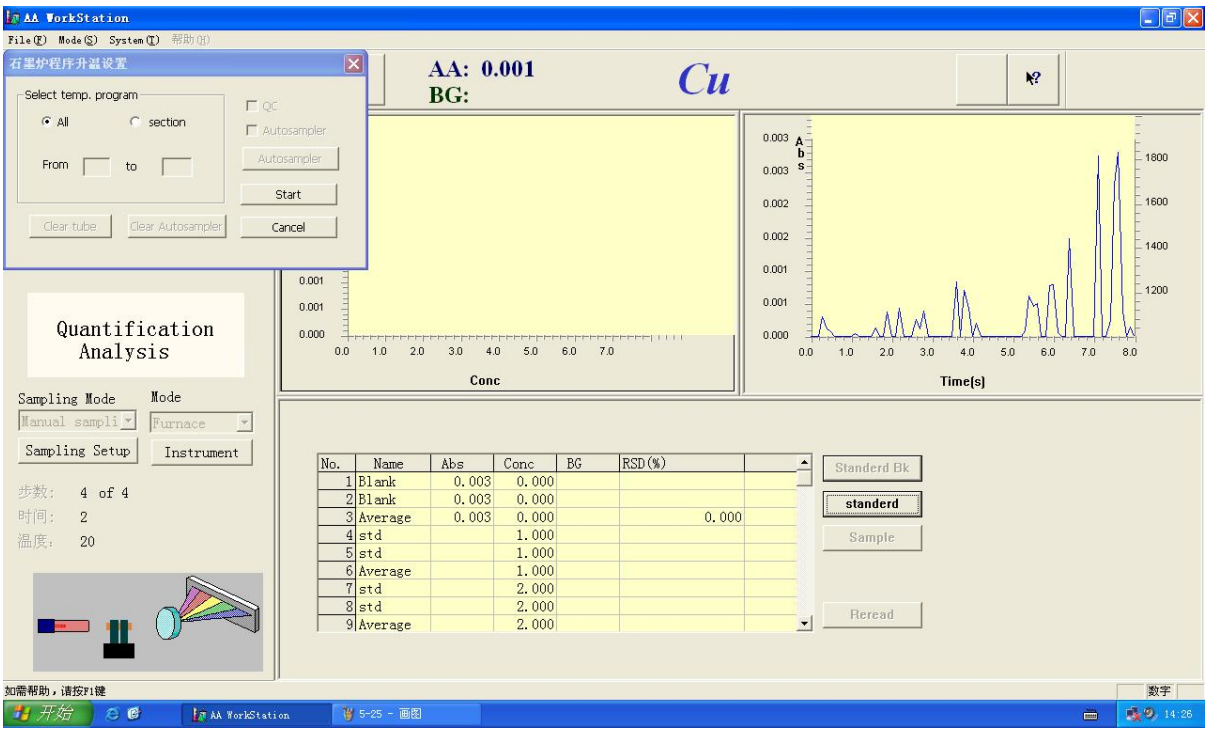


Figure 5-26

19.Now to test standard sample.Sampling standard sample 1,press “Start” to start heating,when a warning tone of “du” sounds sampling standard sample 1 again, when a warning tone of “du” sounds Figure 5-27 pops up

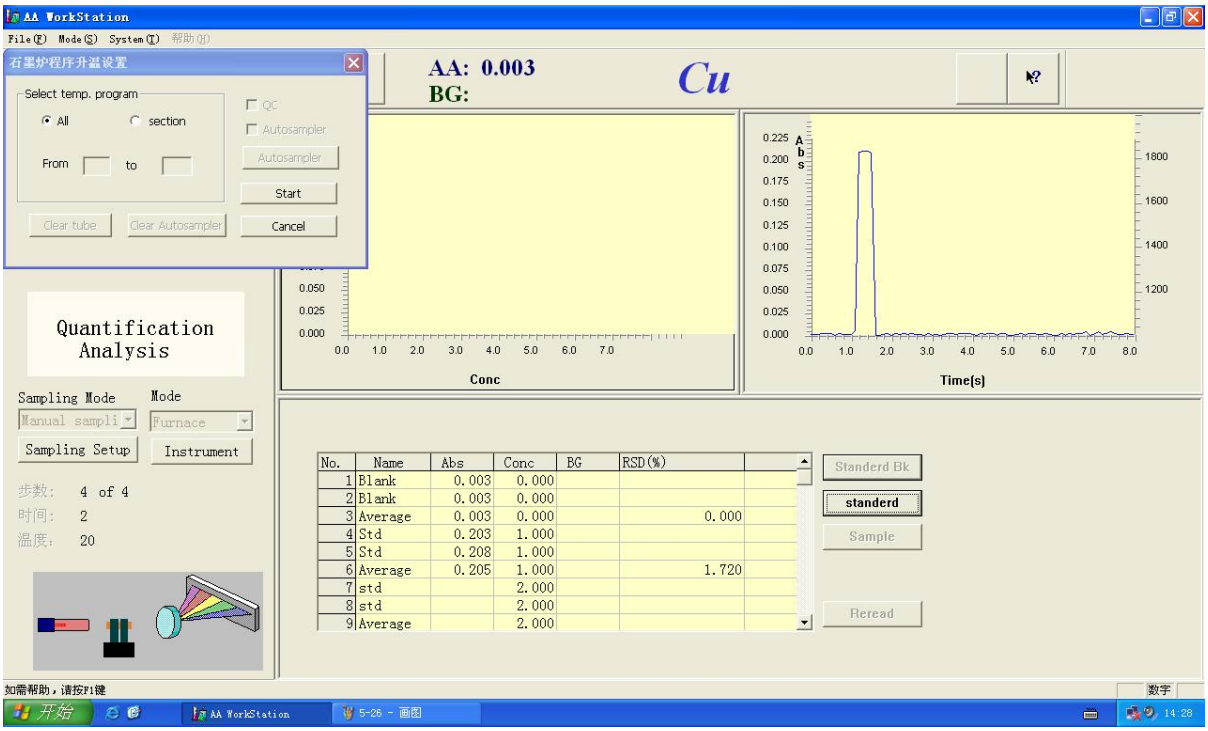


Figure 5-27

20.By the above operation, test another two standard samples,Figure 5-29

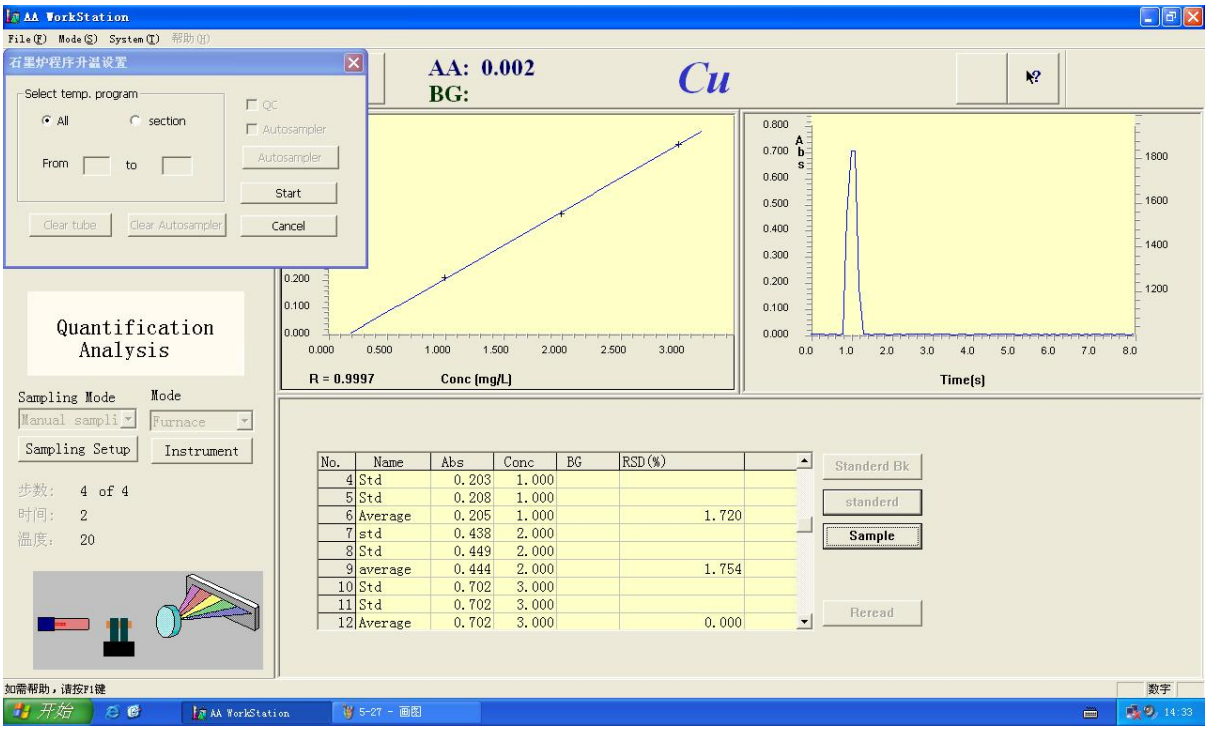


Figure 5-29

21. If you aren't satisfied with the measurement result or want to amend the sample name in Figure 5-14 you can test again or amend the sample name.The detailed method see the "Rereading and changing the name of the sample"

22.Start to test the samples awaiting testing,the method is the same as the above

23. Save and print the data after testing sample

Nonlinear Calibration

It is suitable for the quantitative analysis for nonlinear element

Take Cu lamp 1 as an example

1. Aligning lamps.see" Aligning lamps"

2. Input the appropriate"Read Time" in the "Instrument Page",select appropriate "Reading Mode" (Figure 5-30a)

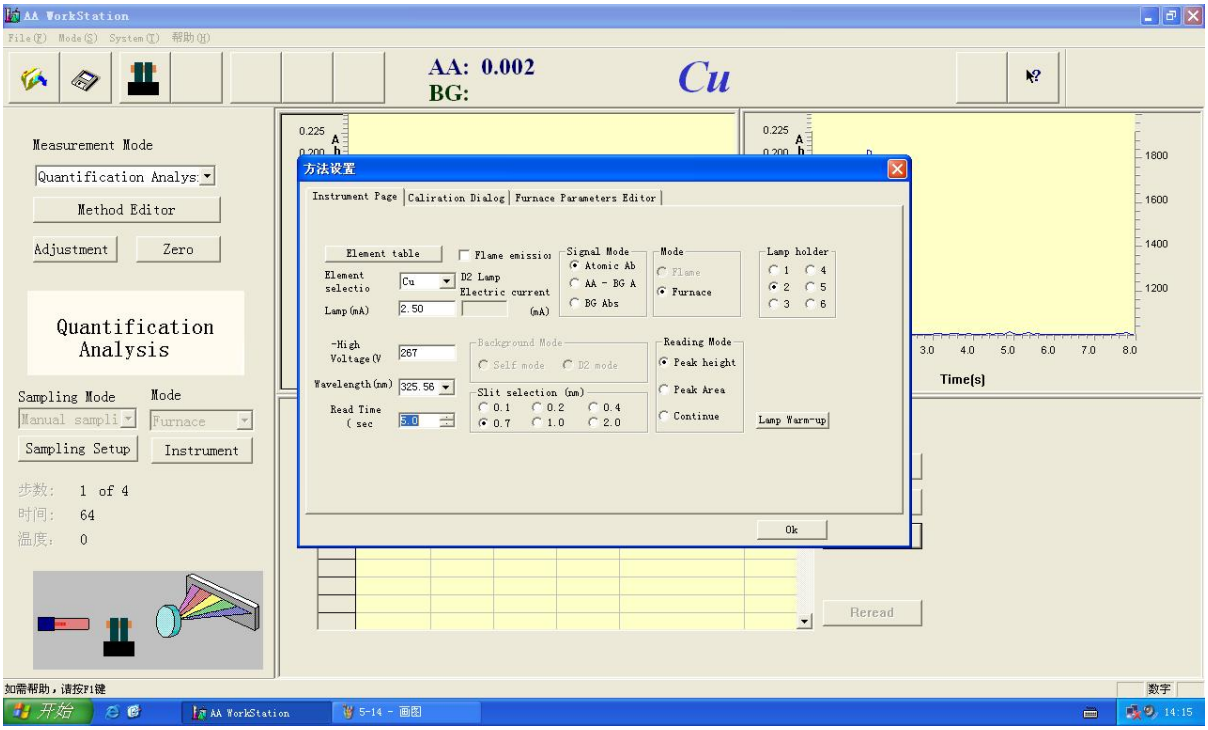


Figure 5-30a

3. Figure 5-30, select the "quantification analysis" from the "Measurement Mode"

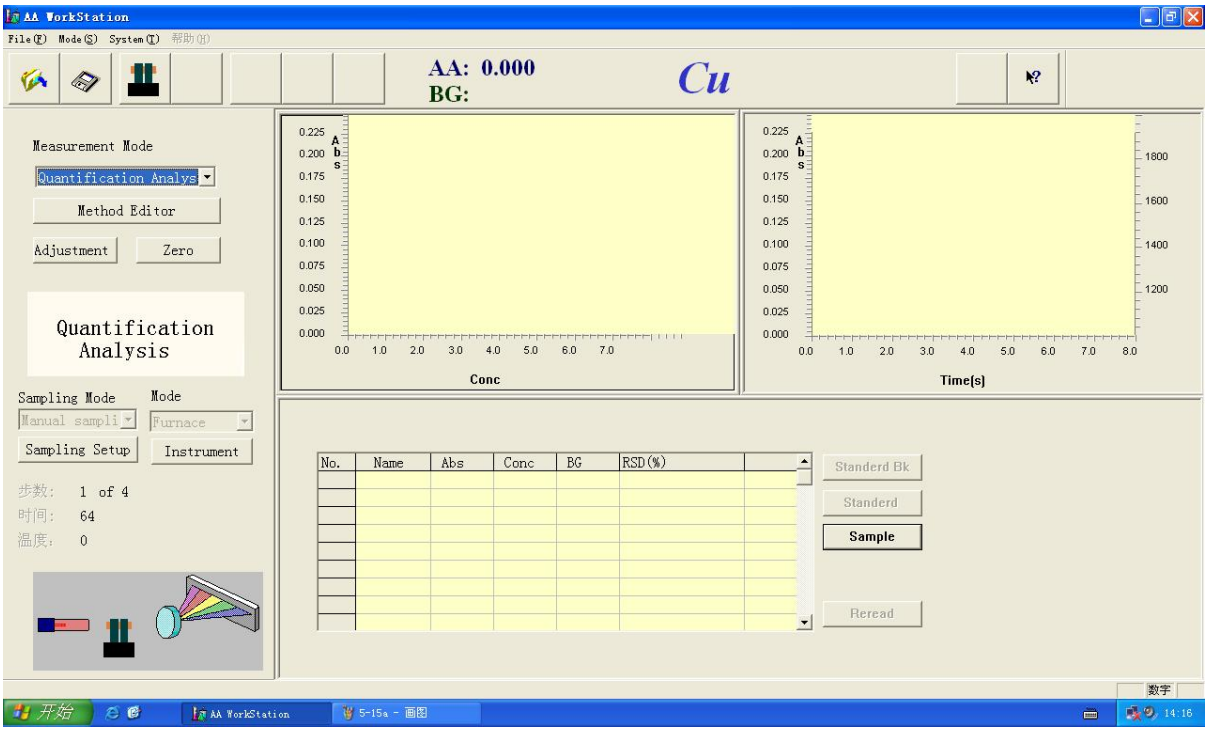


Figure 5-30

4. Press【OK】,open the "Calibration Dialoge"window.figure 5-31

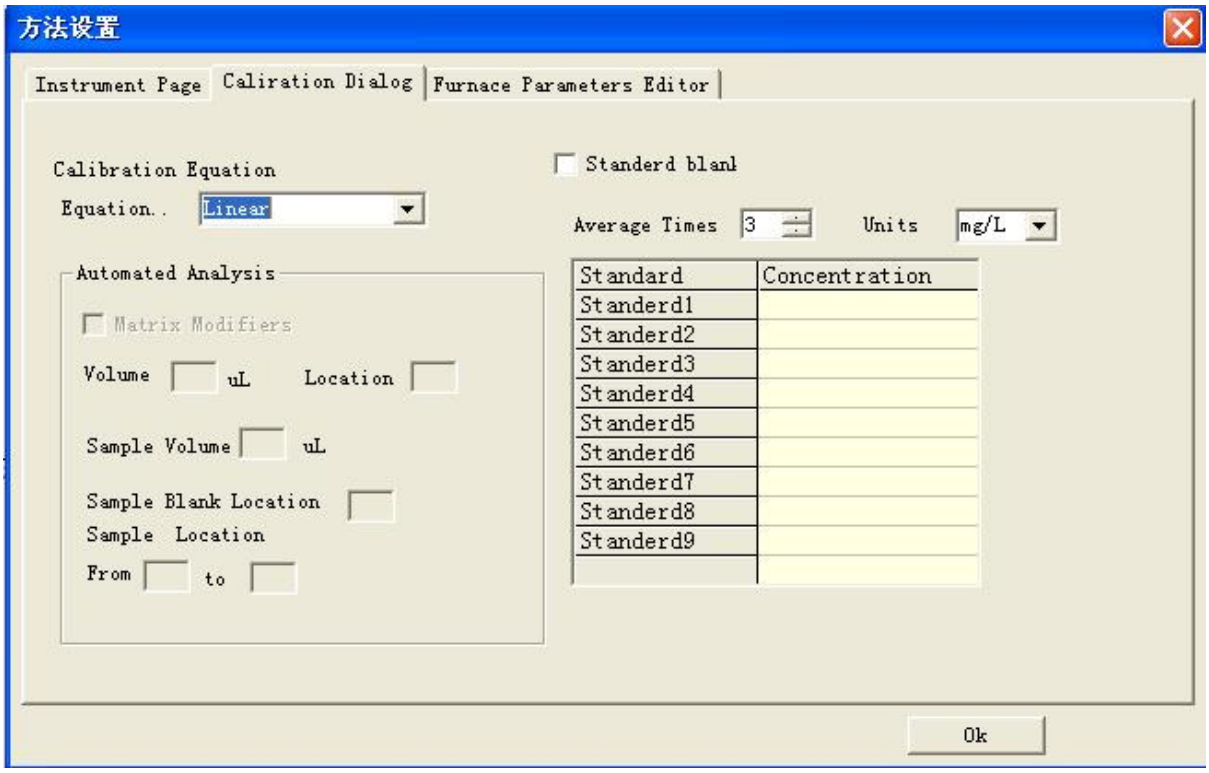


Figure 5-31

5. Select the “Nonlinear”in the “Calibration Equation”,figure 5-32

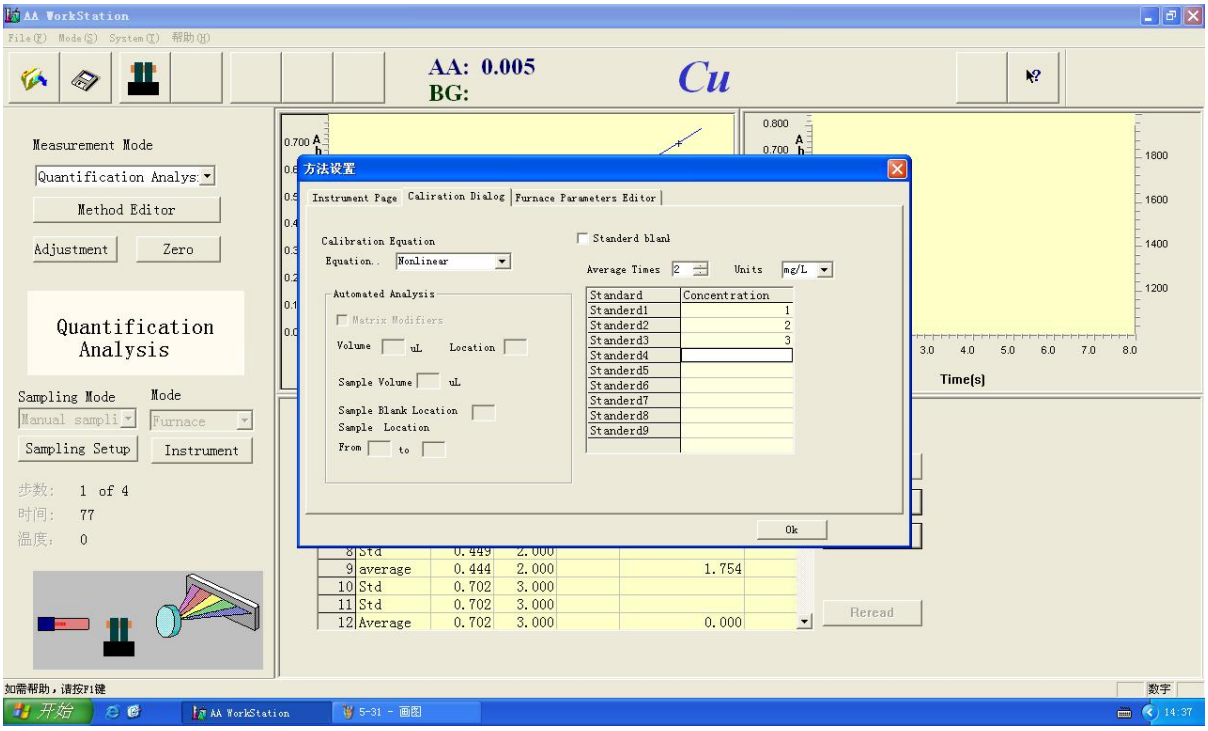


Figure 5-32

NOTICE at least input 3 standard samples

6.Start to test the samples awaiting testing,the method is the same as the above

7.Save and print the data after testing sample

Method of Addition(Linear)

The method allows you accurately analyze samples where the sample matrix has a significant effect on the slope of the calibration curve,an effect that is different for each sample.It includes linear and nonlinea

Take Cu lamp 1 as an example

1. Aligning lamps.see” Aligning lamps”

2. Input 5s on the “Read Time” in the “Instrument Page”,select peak height on the “Reading Mode”

3. Figure 5-35, select the “quantification analysis” from the “Measurement Mode”

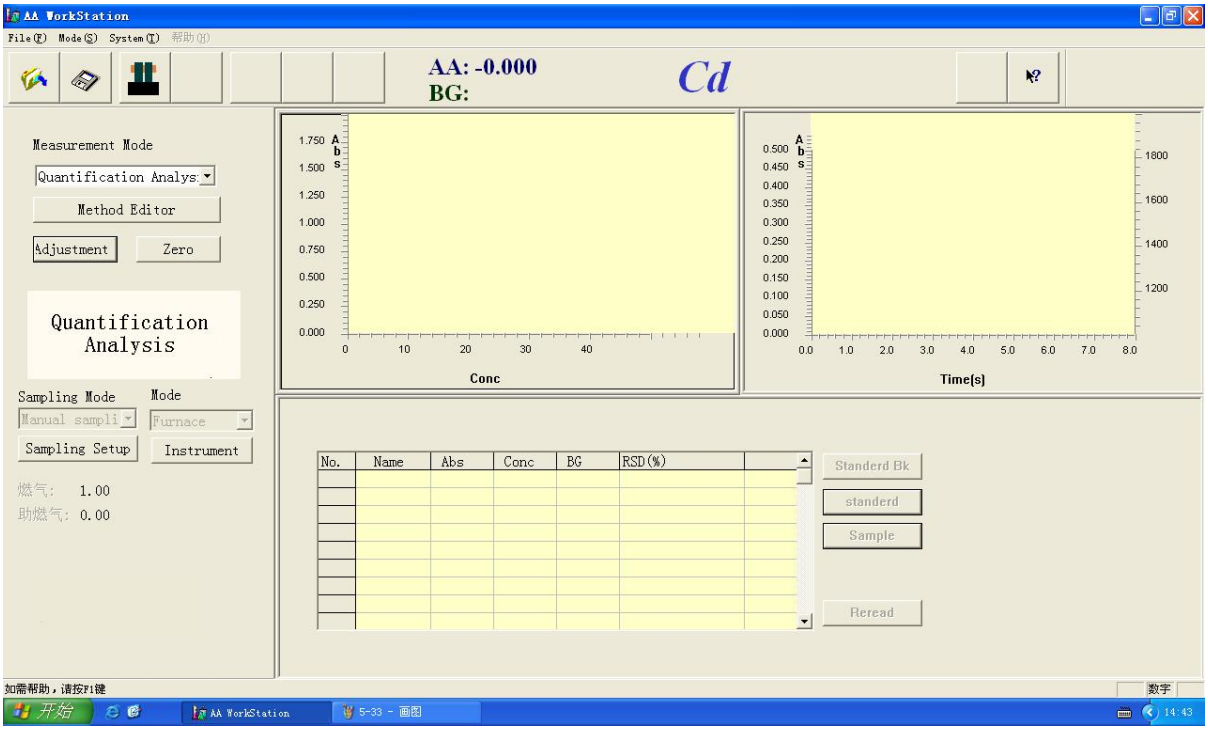


Figure 5-35

4. Press【OK】,open the “Calibration Dialoge”window.figure 5-36

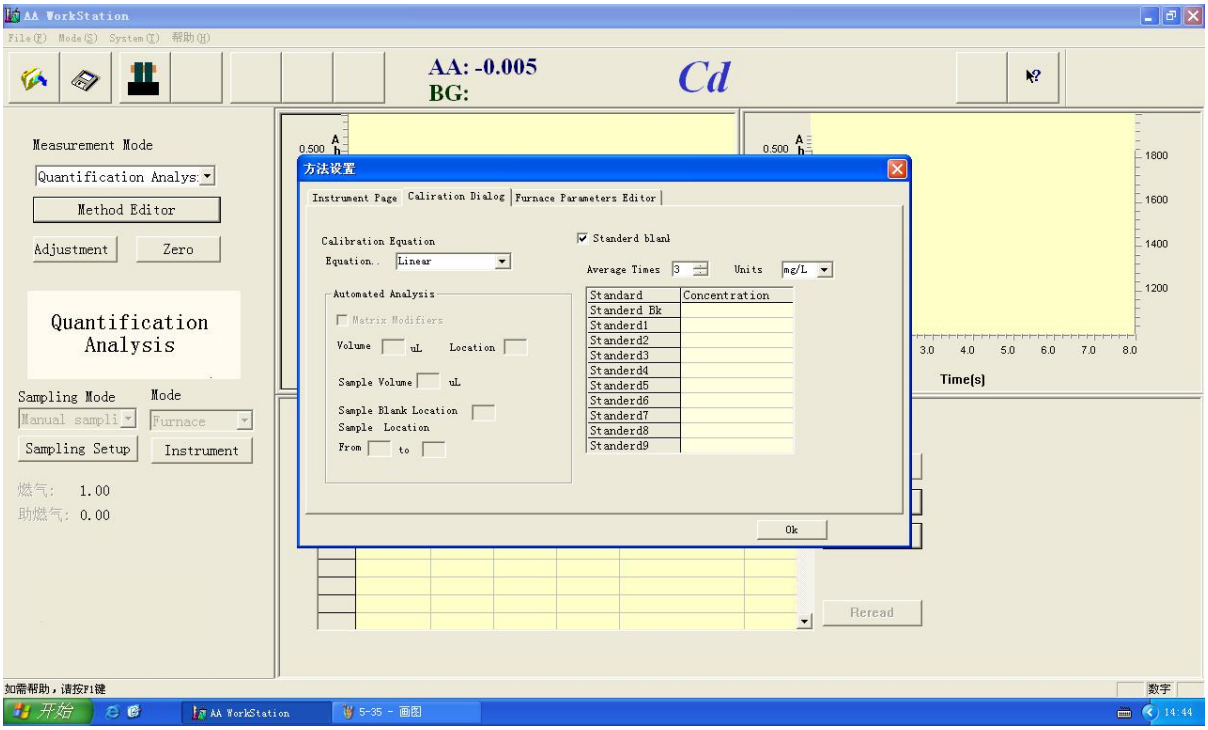


Figure 5-36

5.Select the “Meth.of Addition Linear”in the “Calibration Equation”,figure

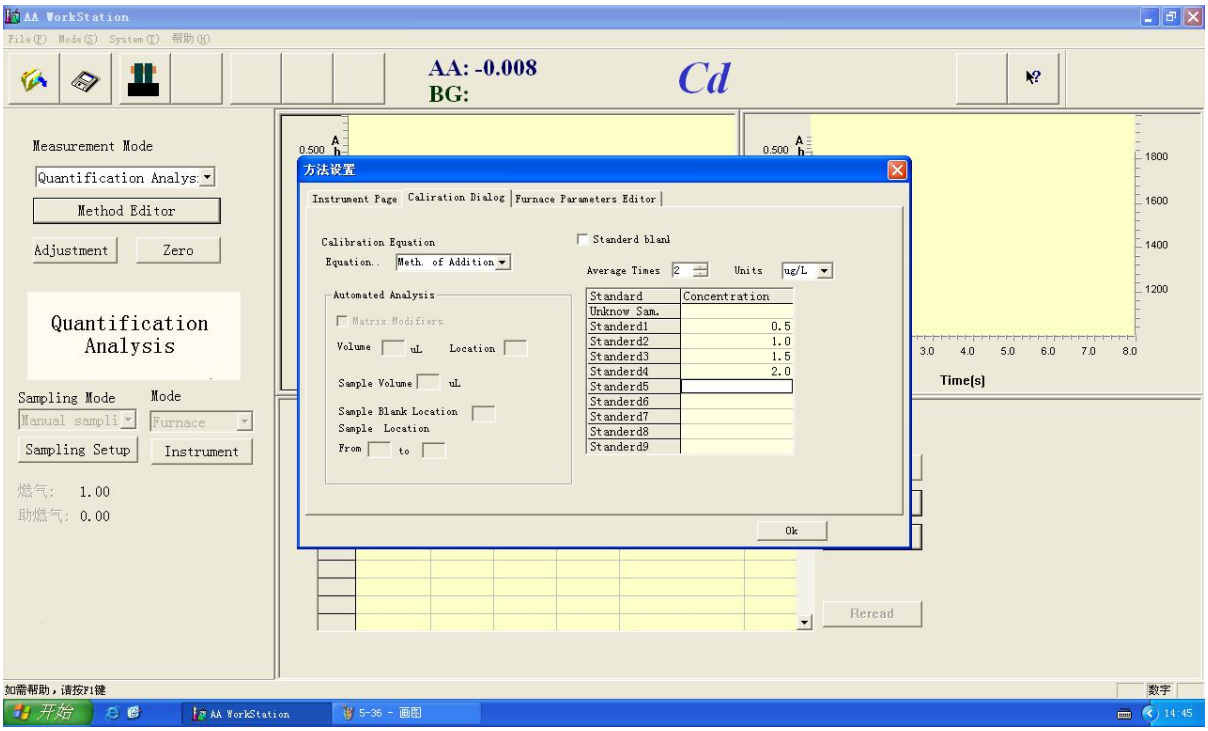


Figure 5-37

Notice:at least input 2 standard samples

6. Press【OK】,close the dialog,"Unknown Sample"brighten,figure 5-38

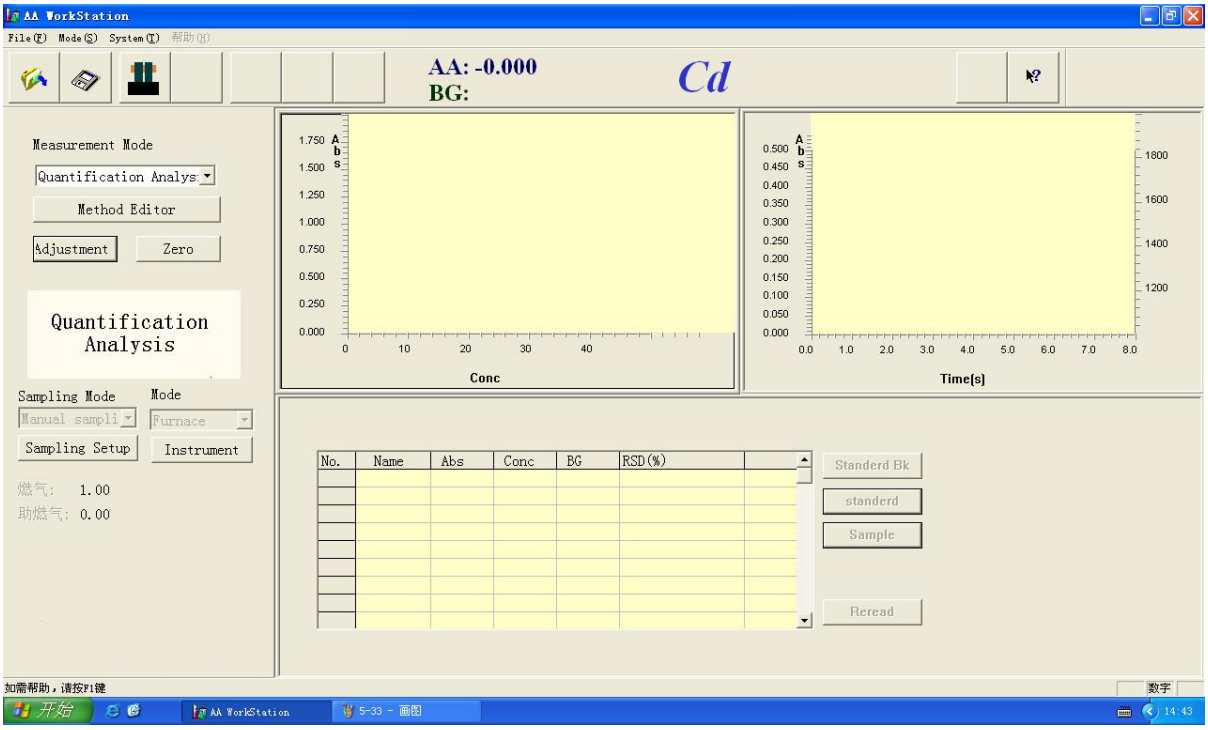


Figure 5-38

7. Press【Instrument】(Figure 5-38),"Furnace Parameters Editor" is displayed,see Figure 5-39

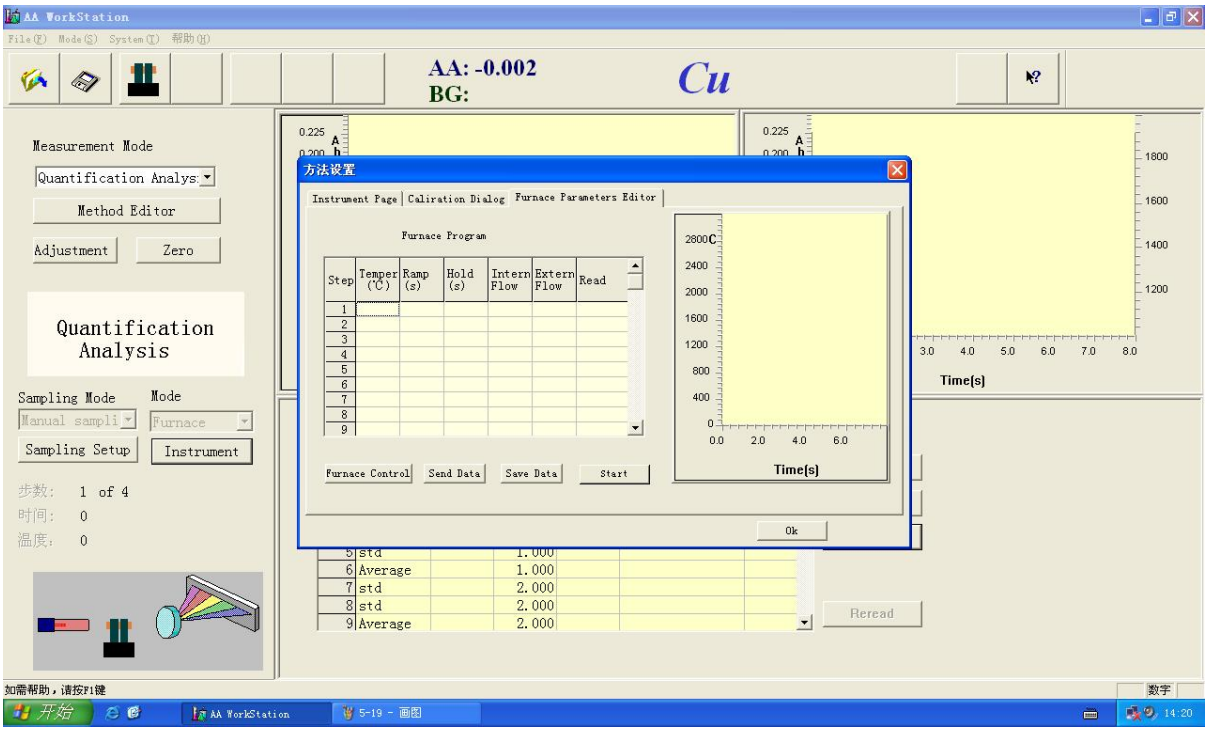


Figure 5-39

8. Input the program,such as input the No.1 program,see Figure 5-40

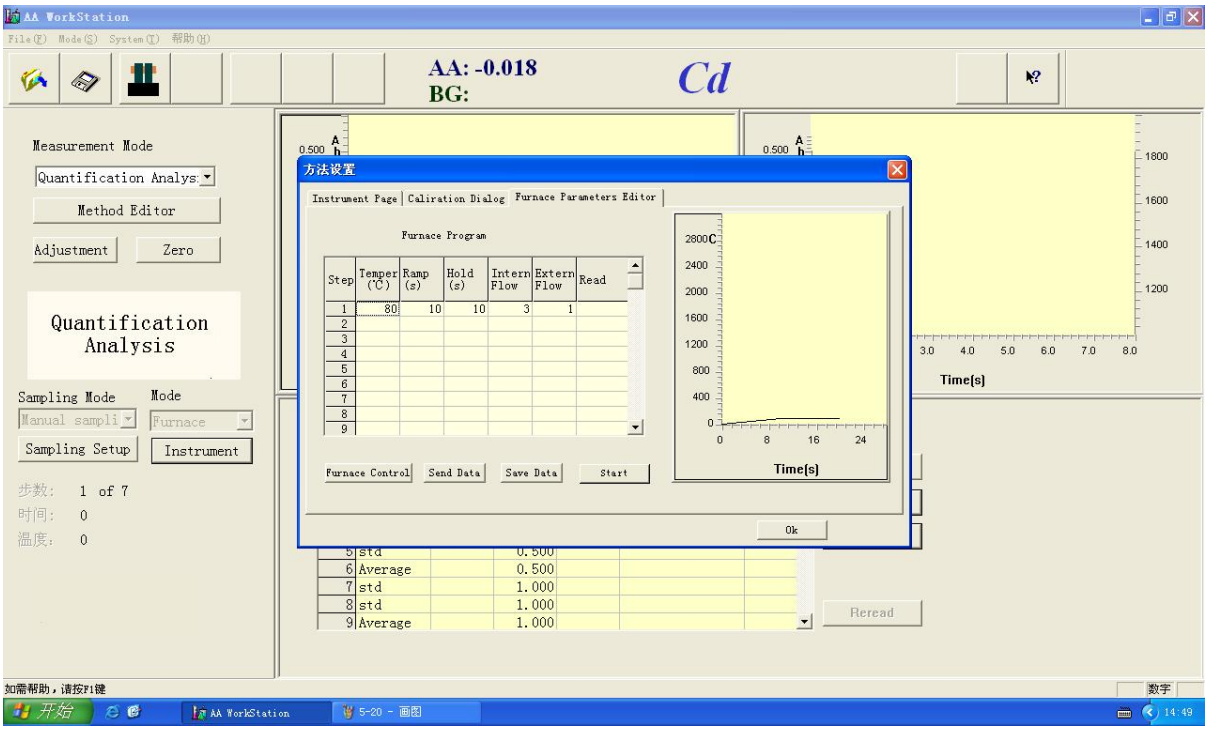


Figure 5-40

9. Input the No.2 program,see Figure 5-41

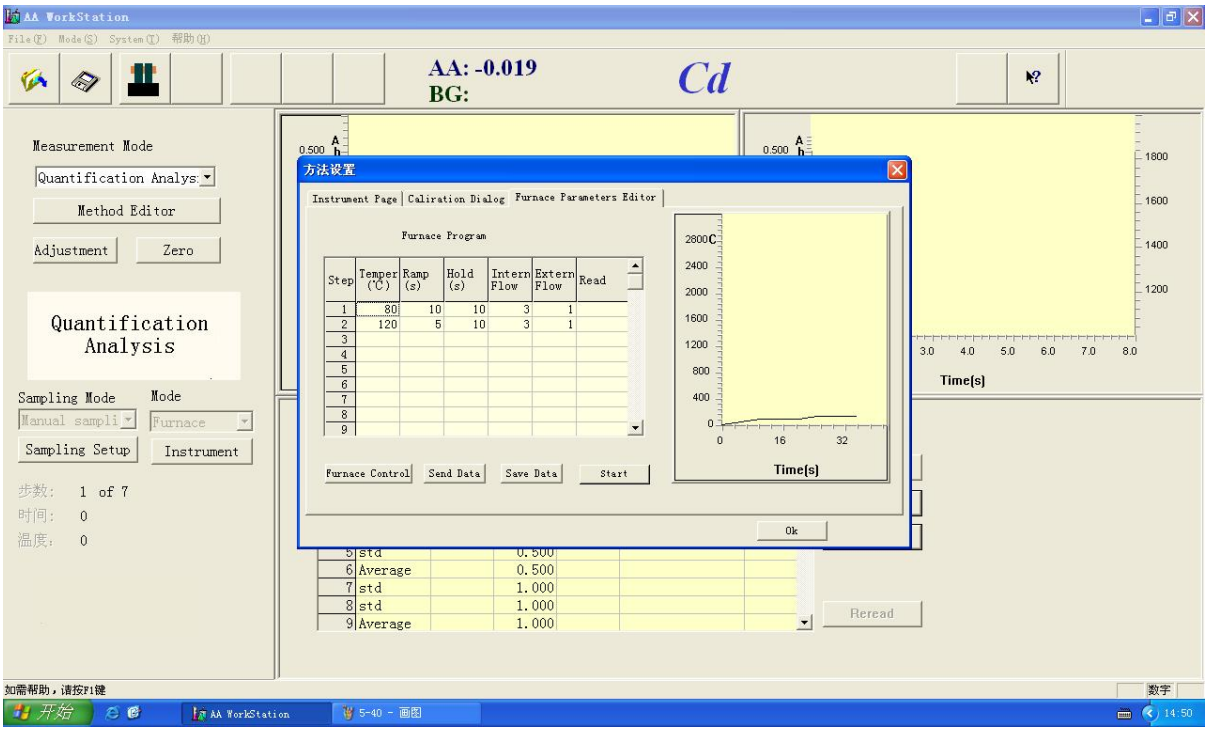


Figure 5-41

10. By analogy, input the corresponding program as shown in figure 5-42 (Note:at most 19 can be input)

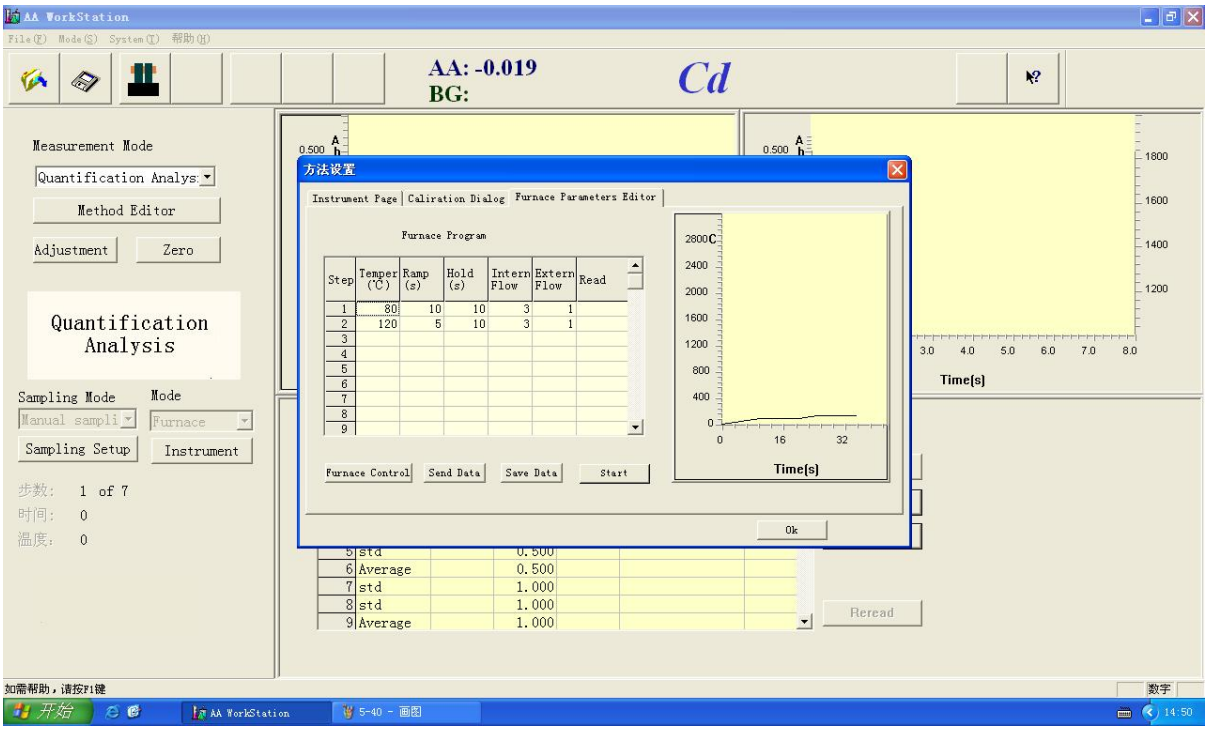


Figure 5-42

11.If you want to alter the programs have been input,please press the right button of the mouse and you can delete or insert,etc.for the detailed information you can see the【Chapter 4】"Furnace Parameters Editor".

12.After setting up press the "Send Data" to send the program to the instrument,press the "Save Data" to save the program.

13.Press the "Start" Figure 5-43 pops up.(If close the "Furnace Parameters Editor" window,press the "Unknown Sample",it pops up as well).

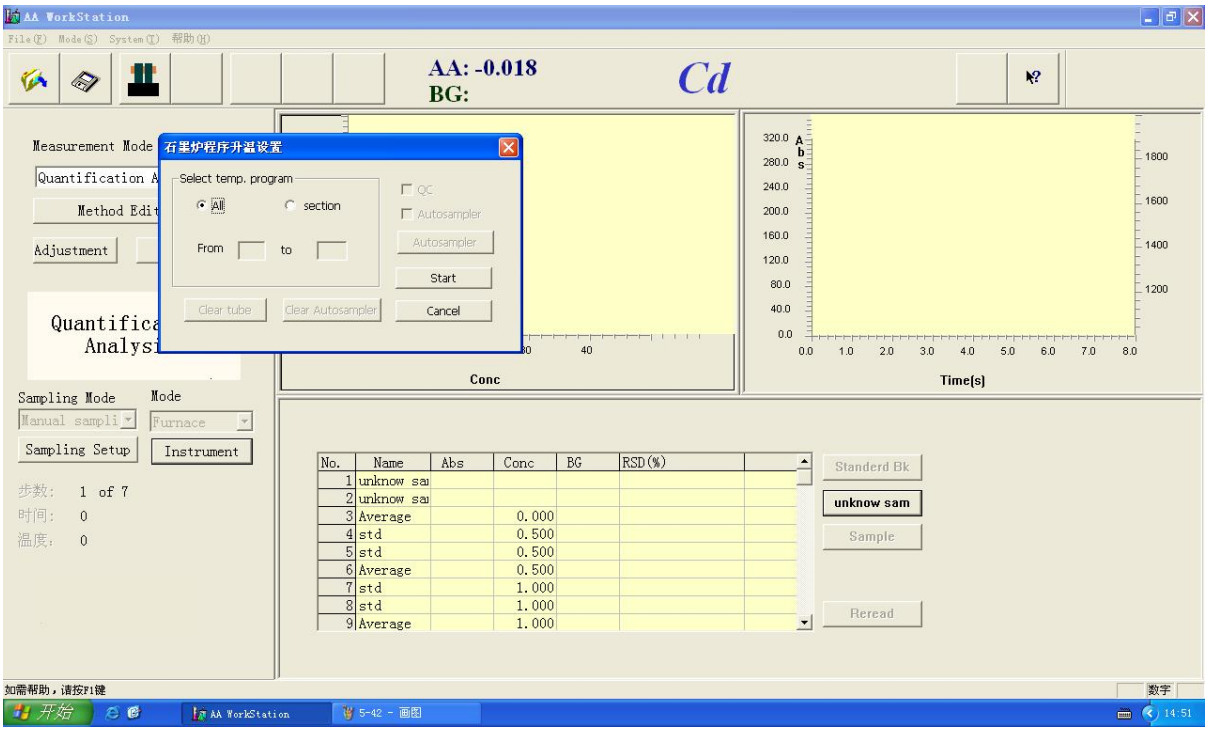


Figure 5-43

14.Sampling unknown samplel.Press “Start” to start heating after sampling,at this time “Start”changes into “Stop”,Figure 5-44

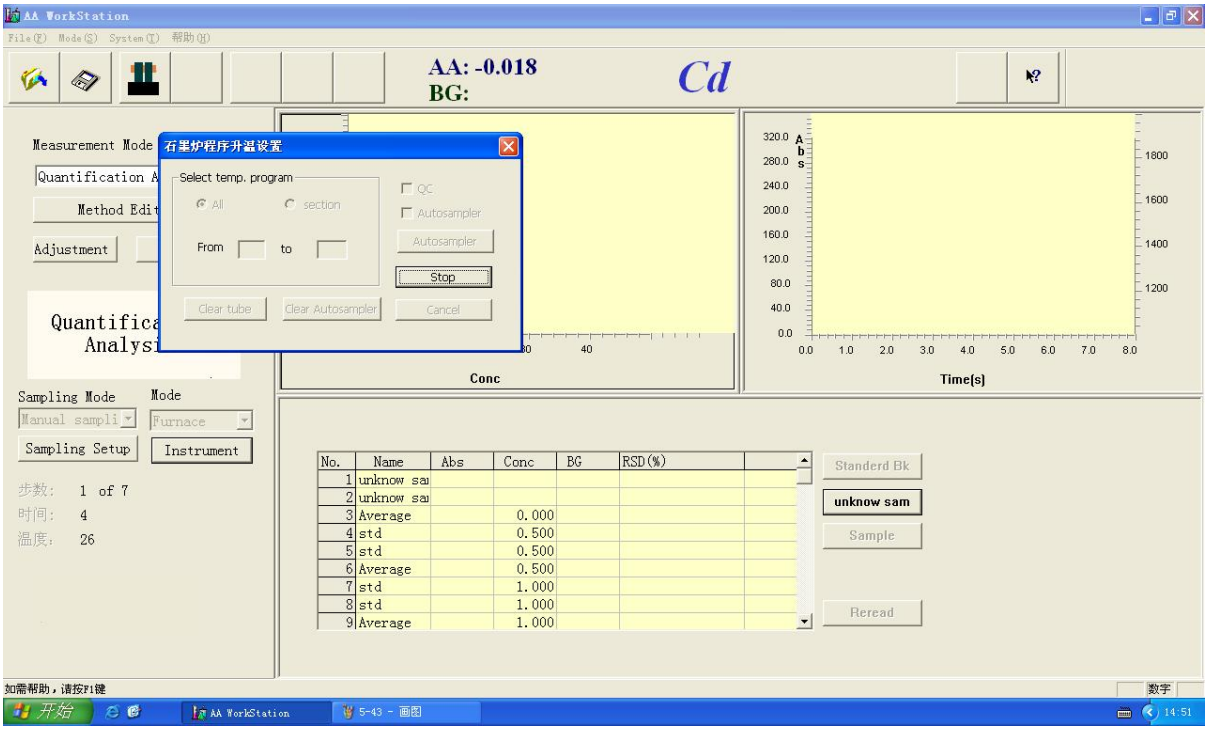


Figure 5-44

15.When a warning tone of “du” sounds sampling unknown sample again,press “Start” to start heating, when a warning tone of “du” sounds Figure 5-49 pops up

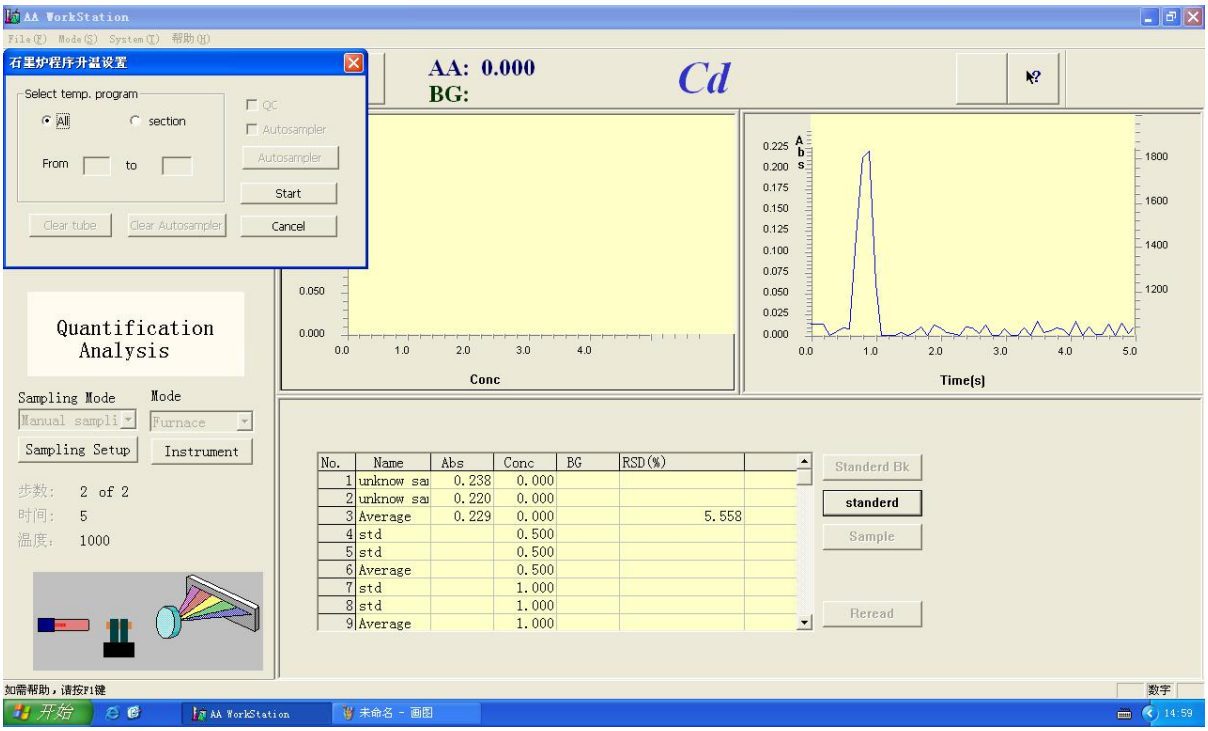


Figure 5-49

16.By the above operation, test another four standard samples,Figure 5-50

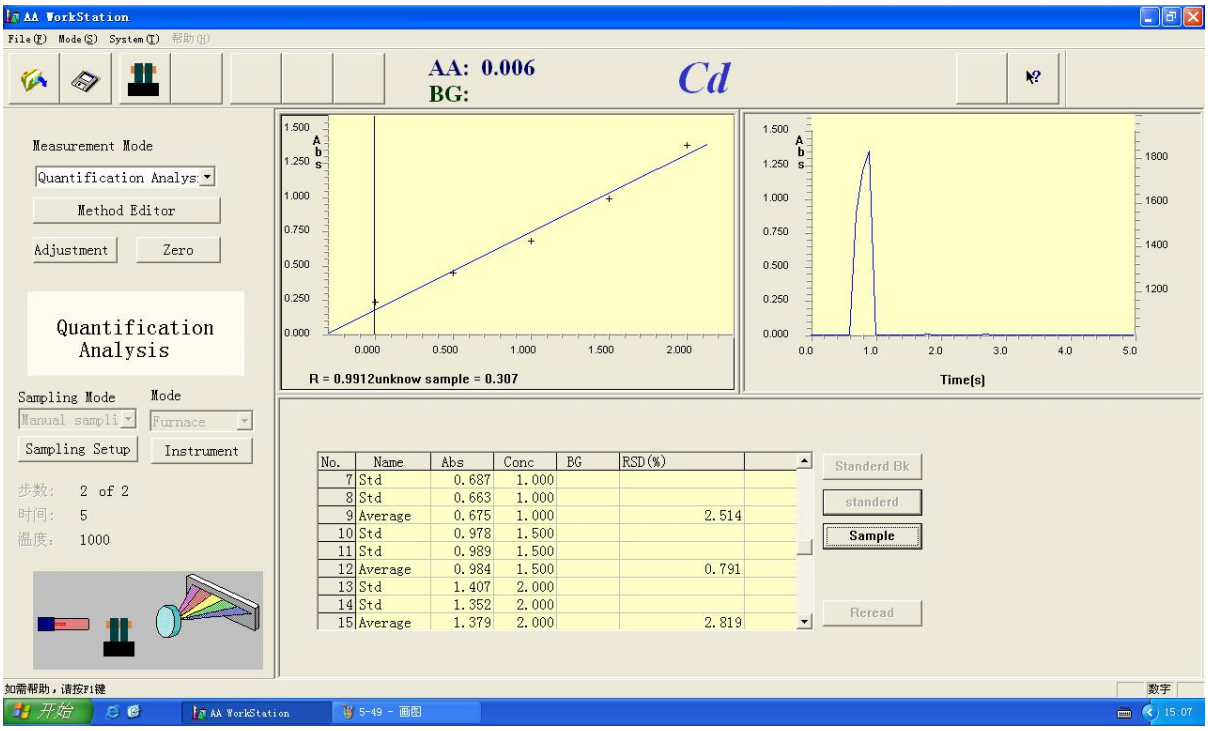


Figure 5-50

17. If you aren't satisfied with the measurement result or want to amend the sample name in Figure 5-50 you can test again or amend the sample name.The detailed method see the "Rereading and changing the name of the sample"

18.Start to test the samples awaiting testing

Save and print the data after testing sample

Method of Additions(Nonlinea)

Take Cu lamp 1 as an example

1. Aligning lamps.see” Aligning lamps”

2. Input 5s on the “Read Time” in the “Instrument Page”,select peak height on the “Reading Mode”

3. Figure 5-52, select the “quantification analysis” from the “Measurement Mode”

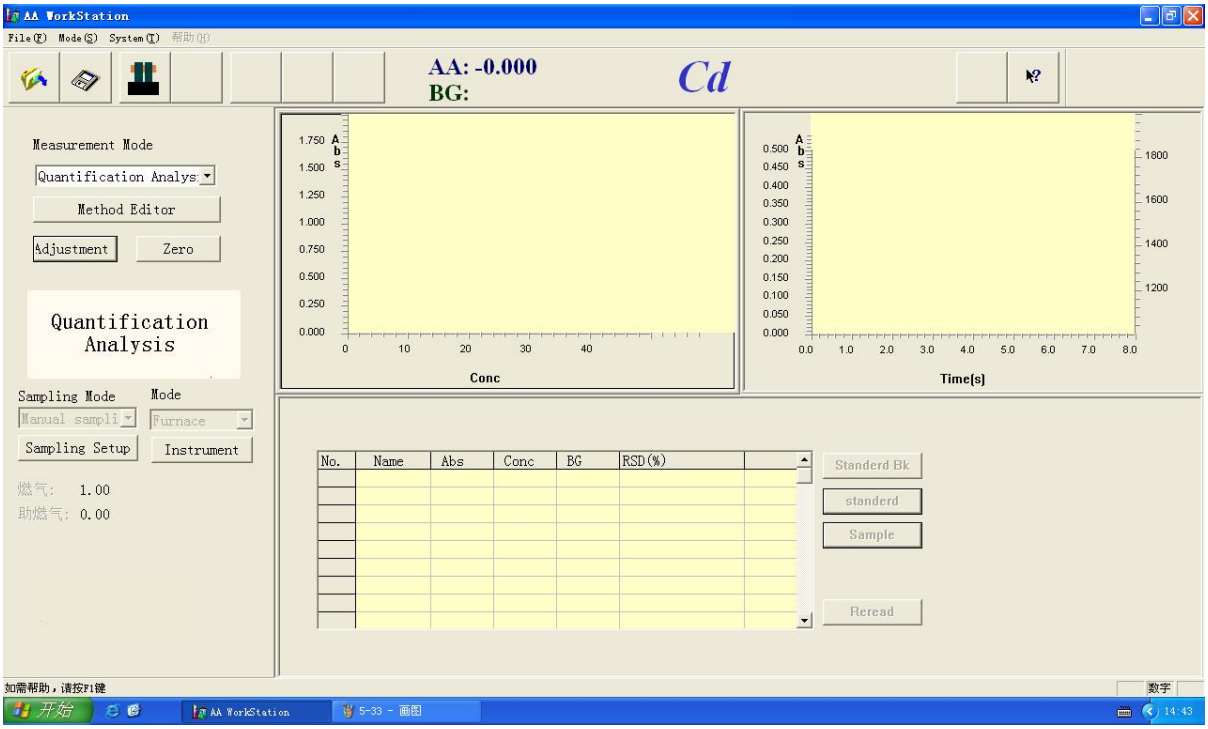


Figure 5-52

4. Press【OK】,open the “Calibration Dialoge”window.figure 5-53

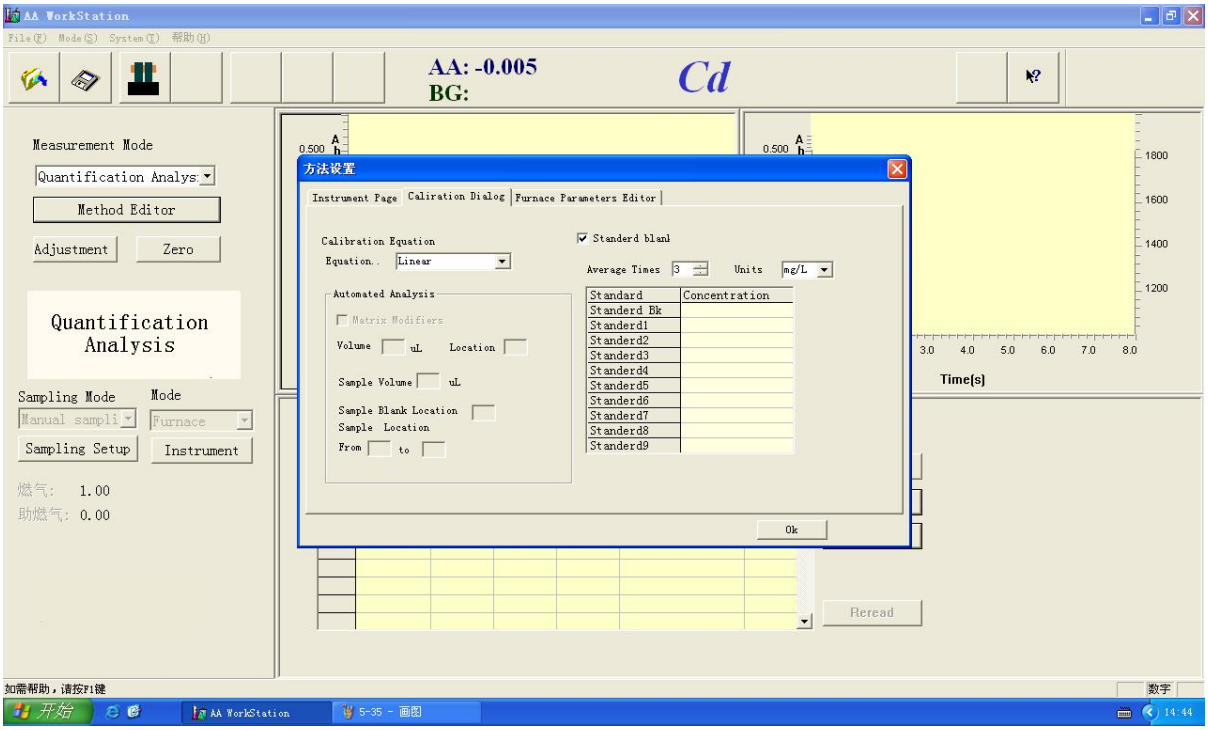


Figure 5-53

5.Select the “Meth.of Addition Nonlinear”in the “Calibration Equation”,figure 5-54

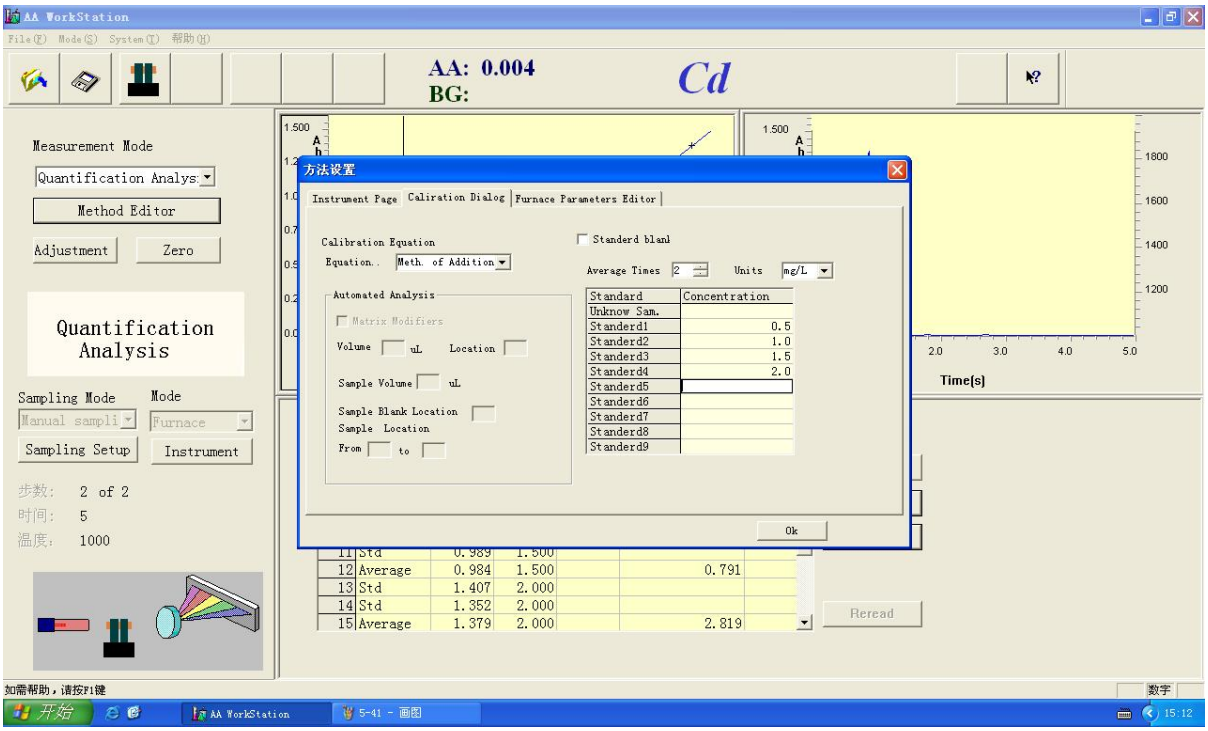


Figure 5-54

Notice:at least input 3 standard samples

6. Press【OK】,close the dialog,"Standard BK"brighten,figure 5-55

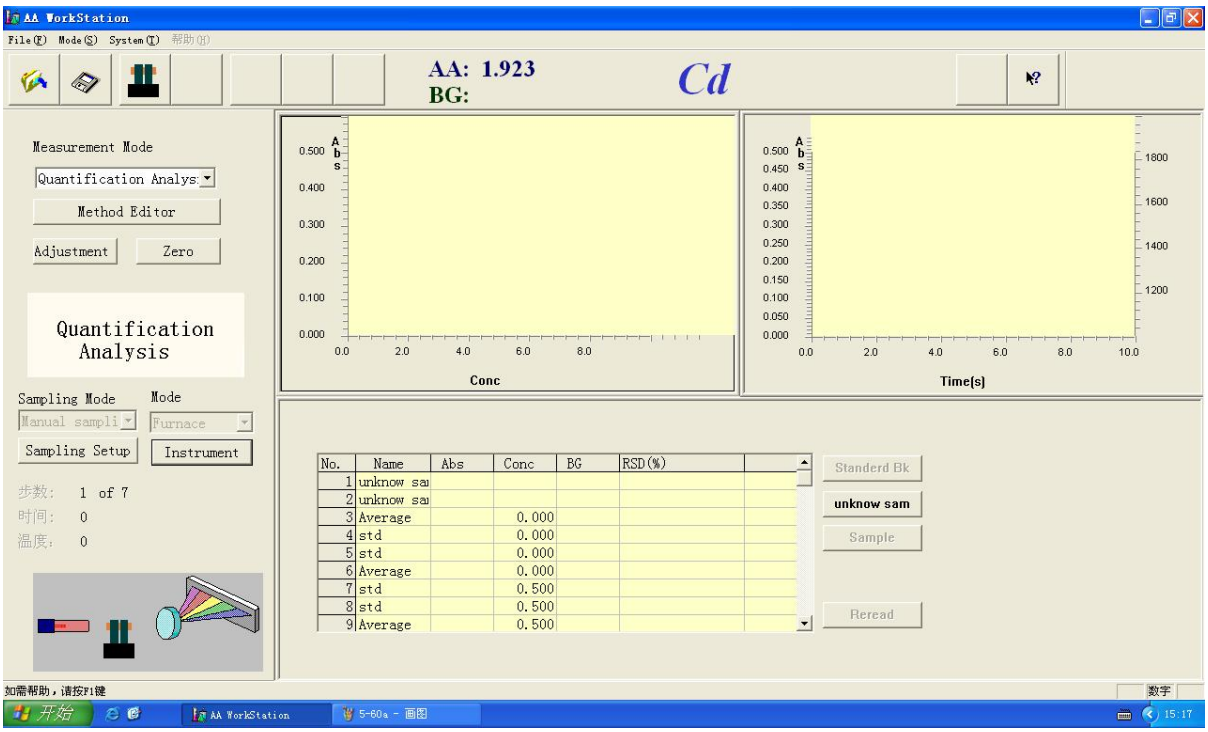


Figure 5-55

7. Press【Instrument】(Figure 5-38),"Furnace Parameters Editor" is displayed,input program,see Figure 5-60a

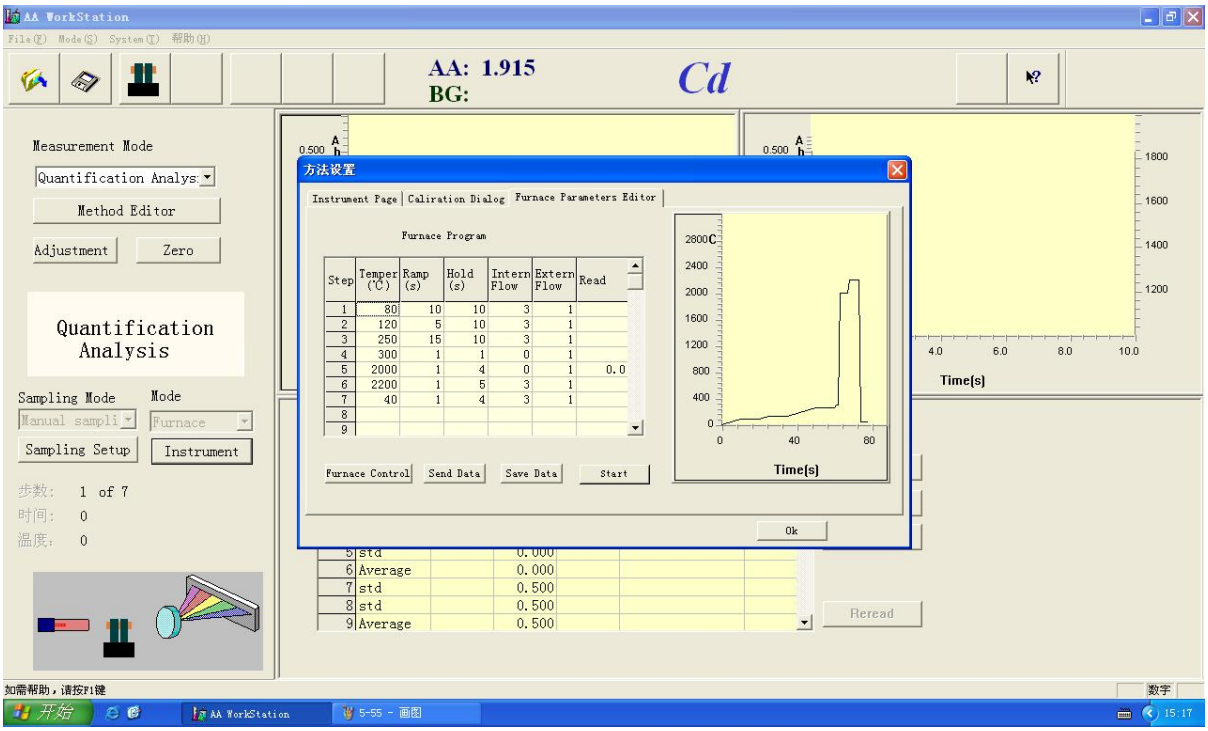


Figure 5-60a

8. Start to test standard samples,the method is the same as the **Method of Addition(Linear).**After testing,Figure 5-60 displays

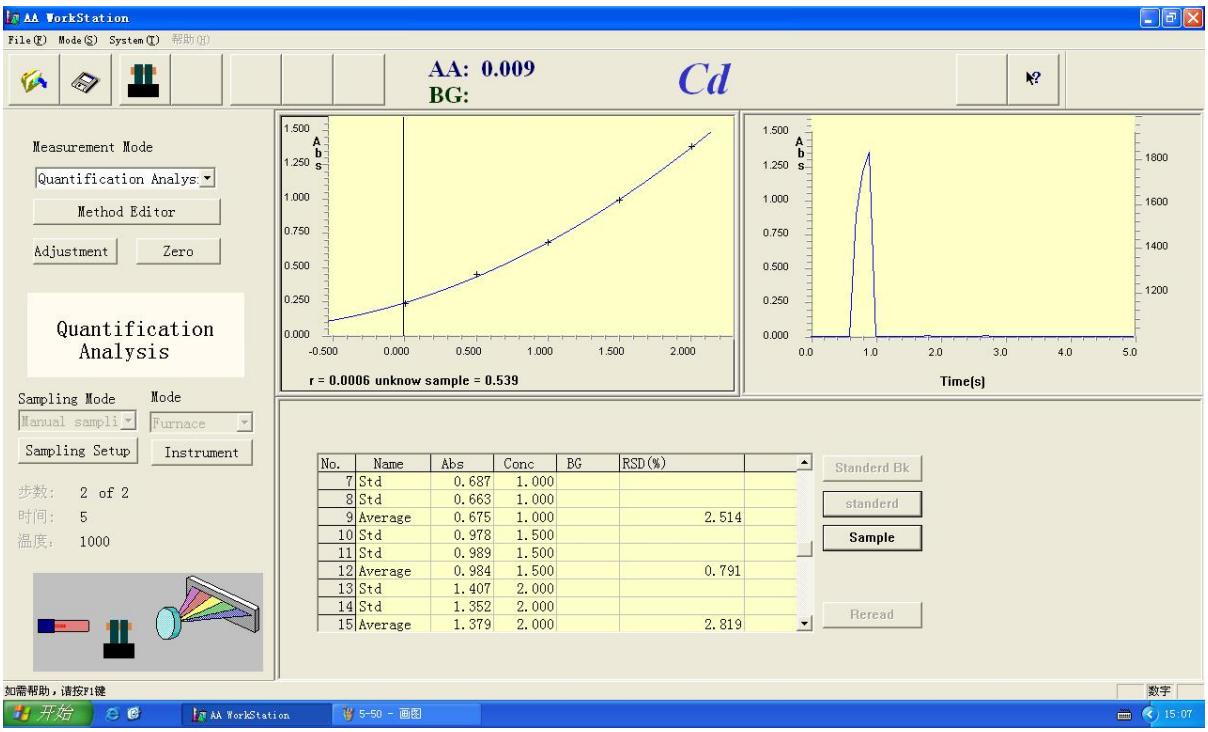


Figure 5-60

9. If you aren't satisfied with the measurement result or want to amend the sample name in Figure 5-50 you can test again or amend the sample name.The detailed method see the "Rereading and changing the name of the sample"

10.Start to test the samples awaiting testing

Save and print the data after testing sample

Rereading and changing the name of the sample

Rereading

If you are not satisfied with the data after testing the samples,you can test again.For example,if you are not satisfied with the result of sample 7,fisrt close the “Furnace Program” then select it with the cursor,figure 5-64

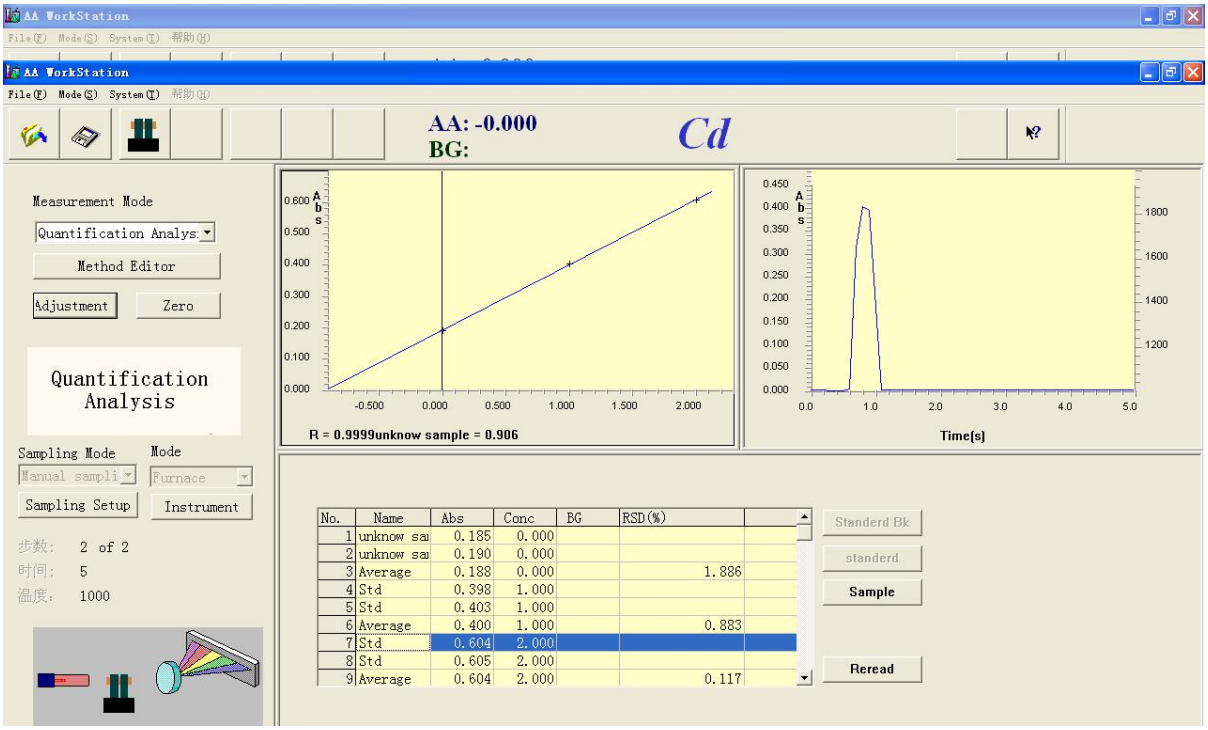


Figure 5-64

2. Sampling again,press【Reread】button,display the figure 5-65

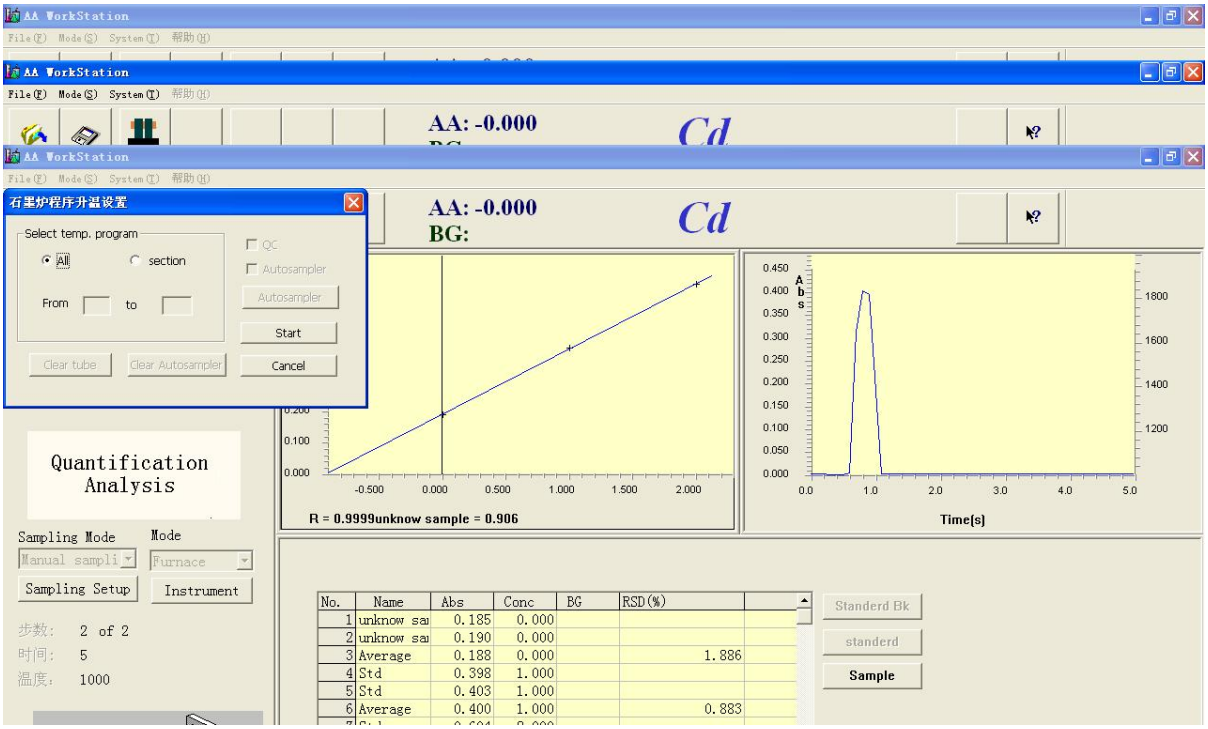


Figure 5-65

3.Press “Start” start to heating,when a warning tone of “du” sounds shows the reread is over,Figure 5-66 pops up.

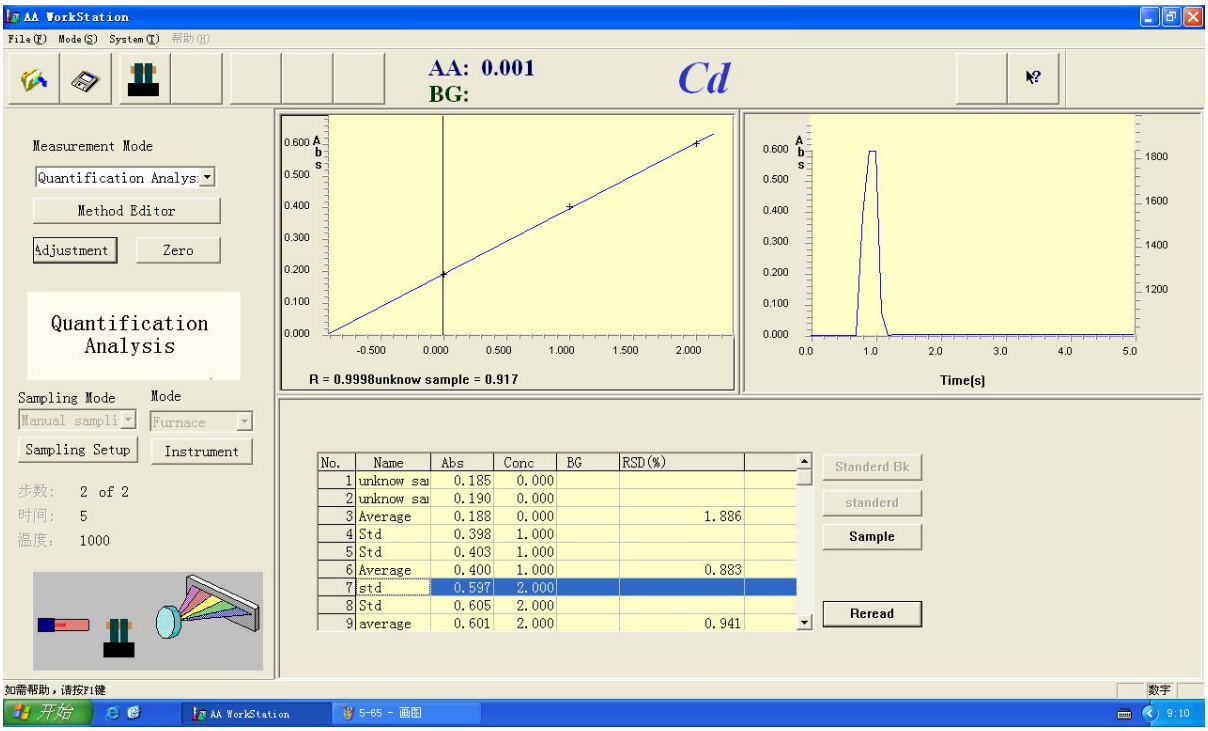


Figure 5-66

Changing the Name of the samples

The name of the samples can be changed according to the user's requirements.For example,when you want to change the sample's name of No.7 in the figure 5-66,please click on the name twice,delete the name and input new name,display the figure Figure 5-67

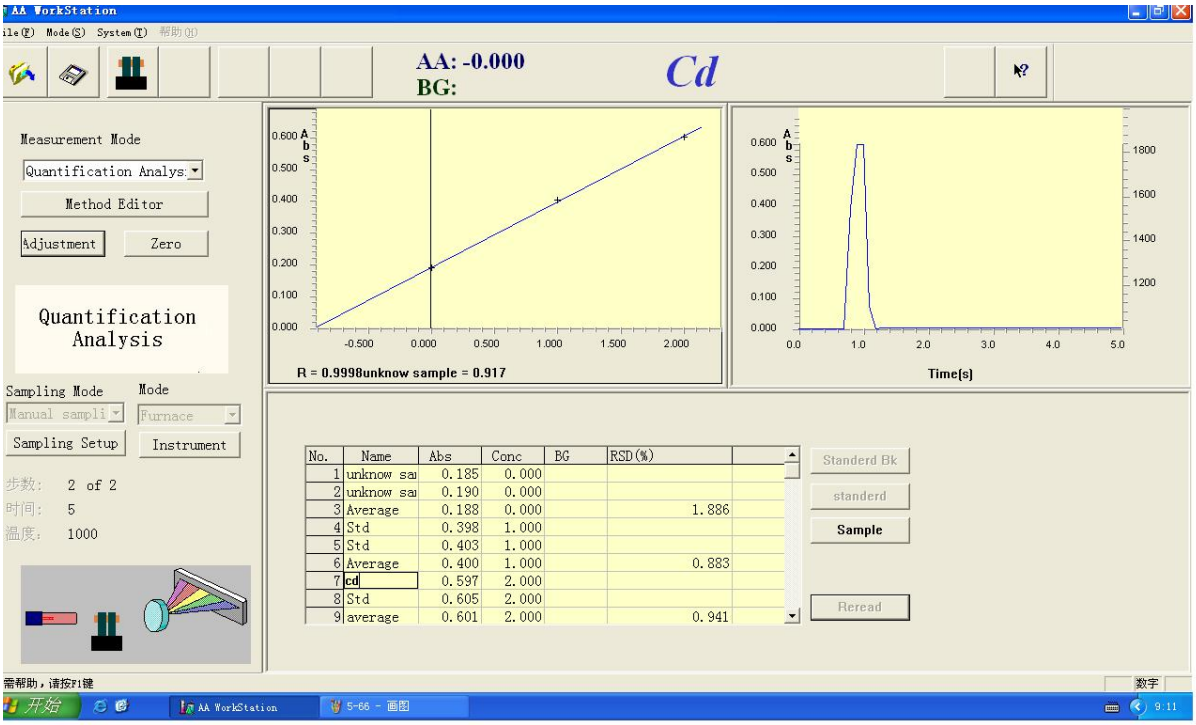


Figure 5-67

Deleting the standard samples

Move the cursor to the sample awaiting for be deleted,click the right button of the mouse then delete it,Figure 5-68(Notice:if you have tested the sample,it can not be deleted or rereaded)

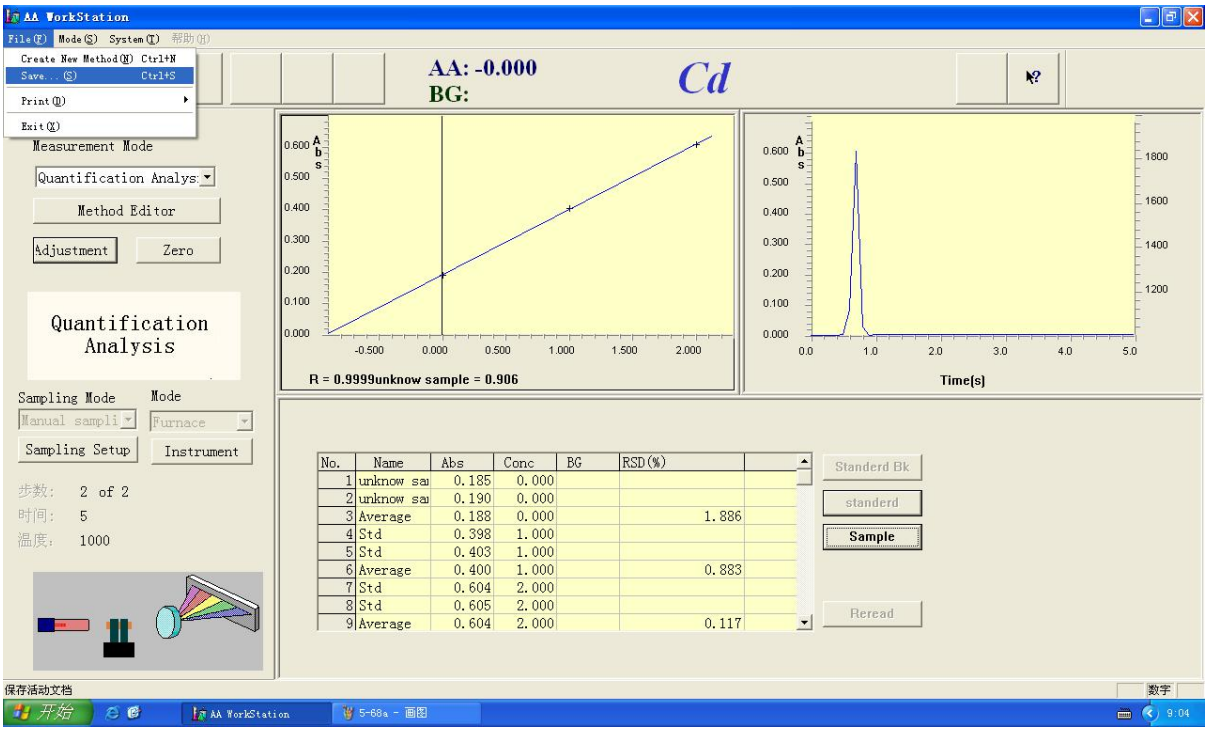


Figure 5-68

Saving

1.Close the “Furnace Program” dialog box after testing the samples.Click the “Save” on the toolbar as shown in Figure 5-68a,or select the “Save Data” in the file menu as shown in Figure 5-68,then Figure 5-69 pops up

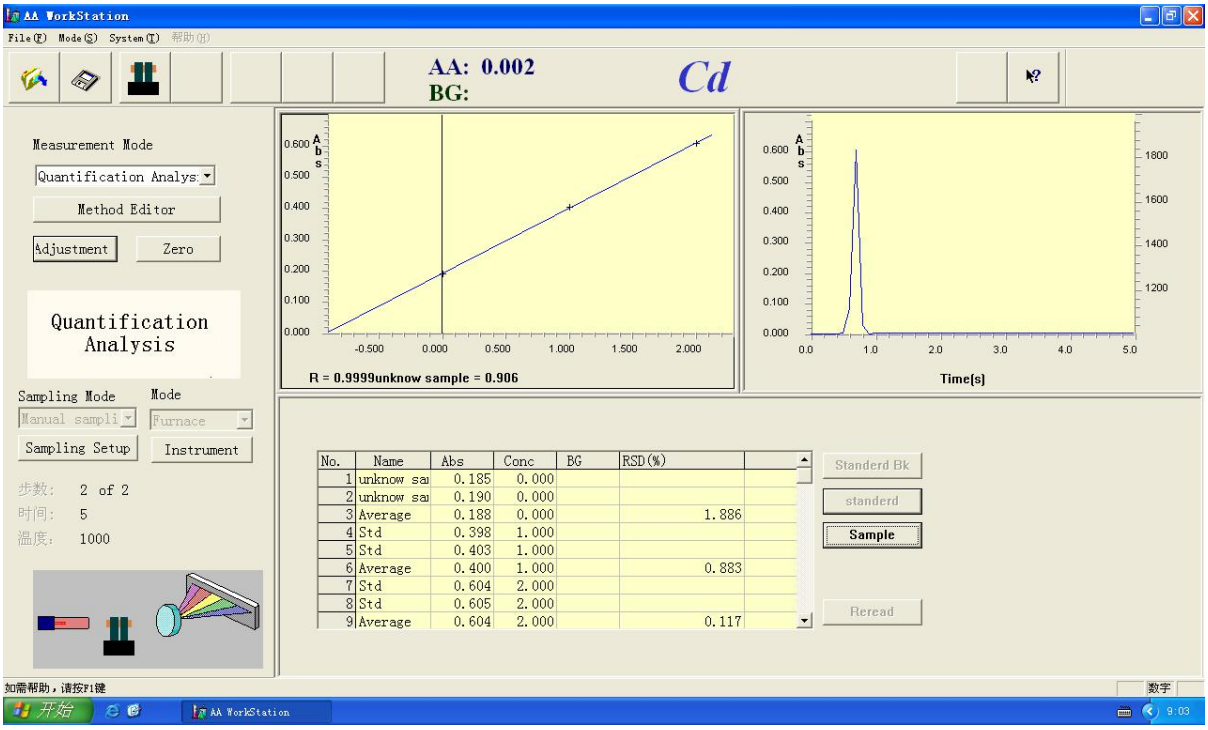


Figure 5-68a

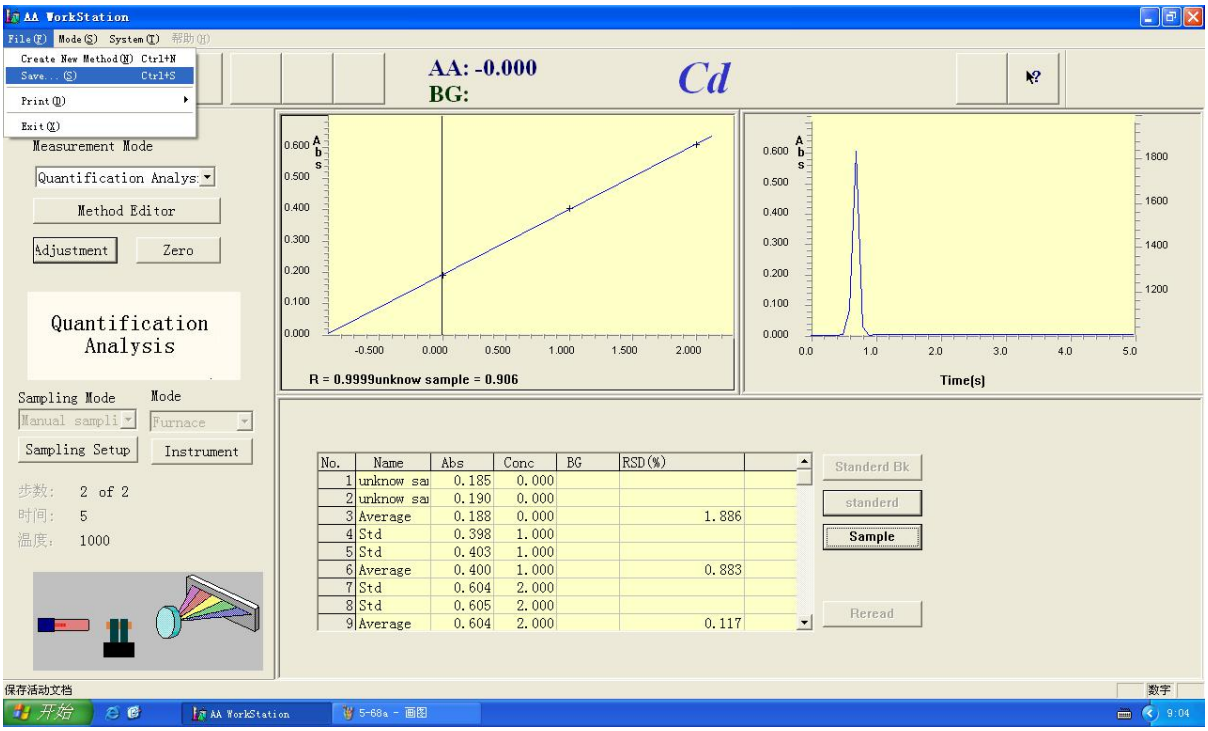


Figure 5-68

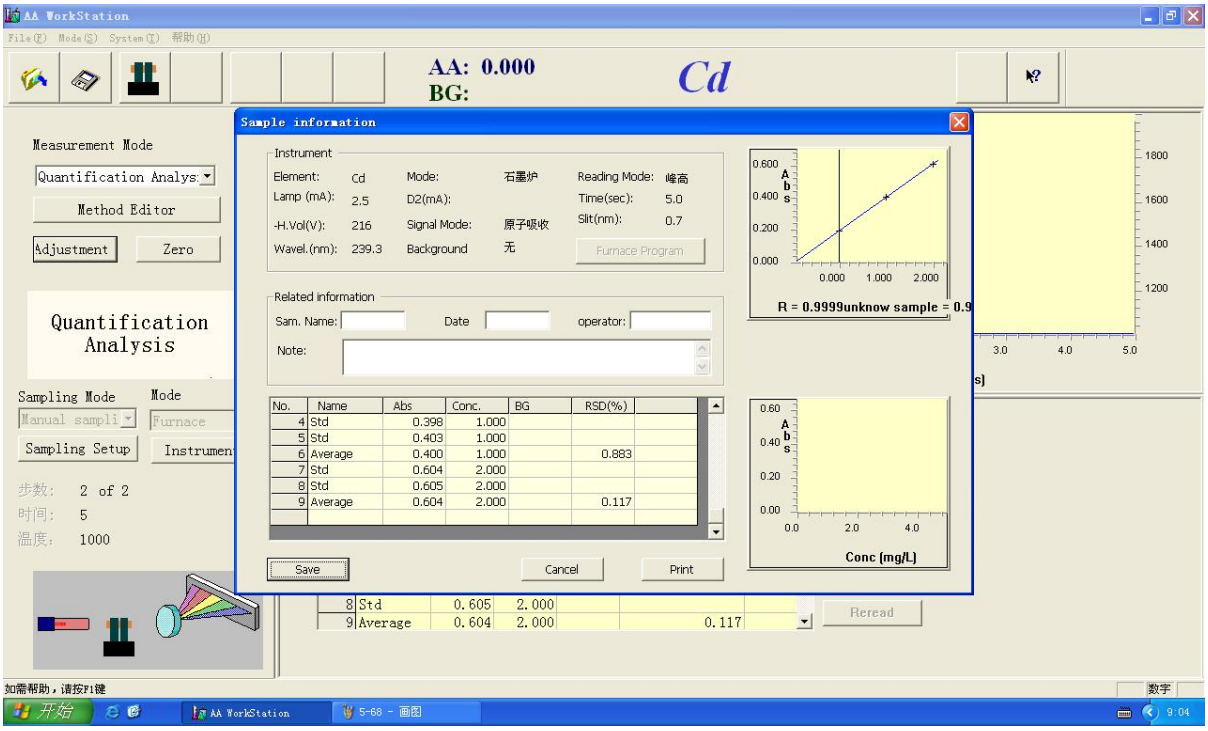


Figure 5-69

2.Input the sample name,operator,date and note in the dialog box of “Sample Information”

3.Press “Save” Figure 5-70 displays,input file name,press “Save”

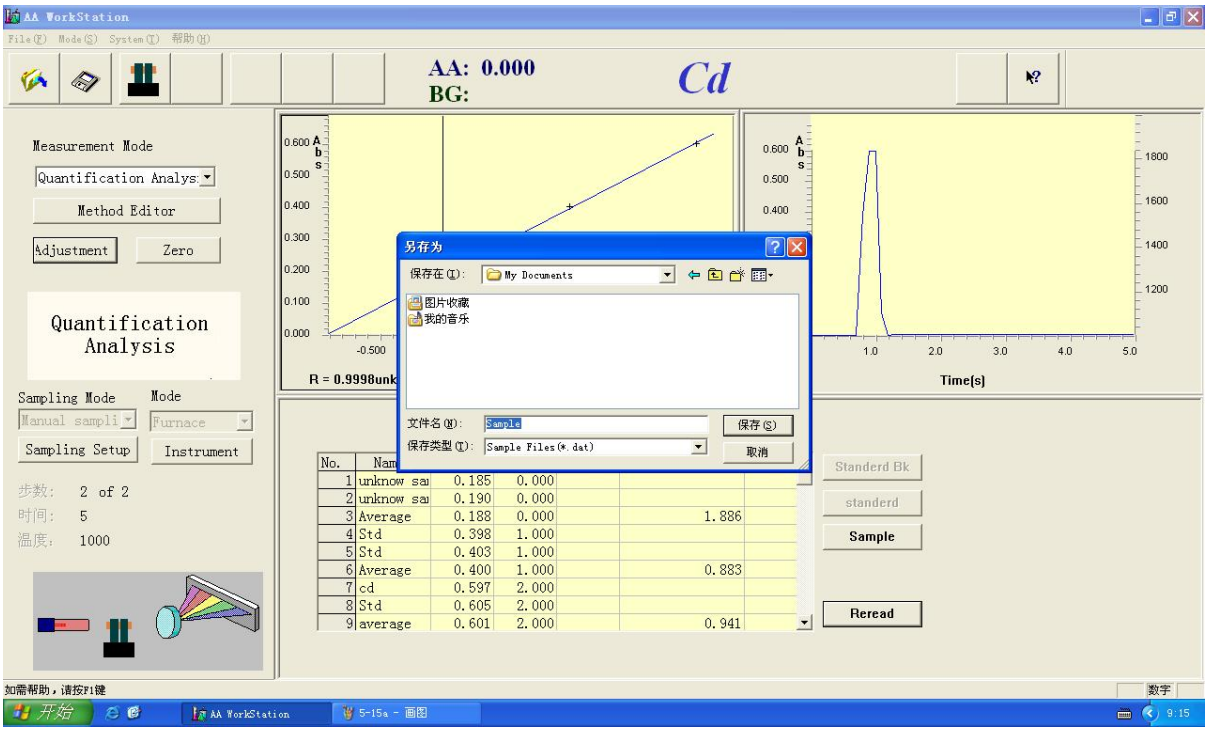
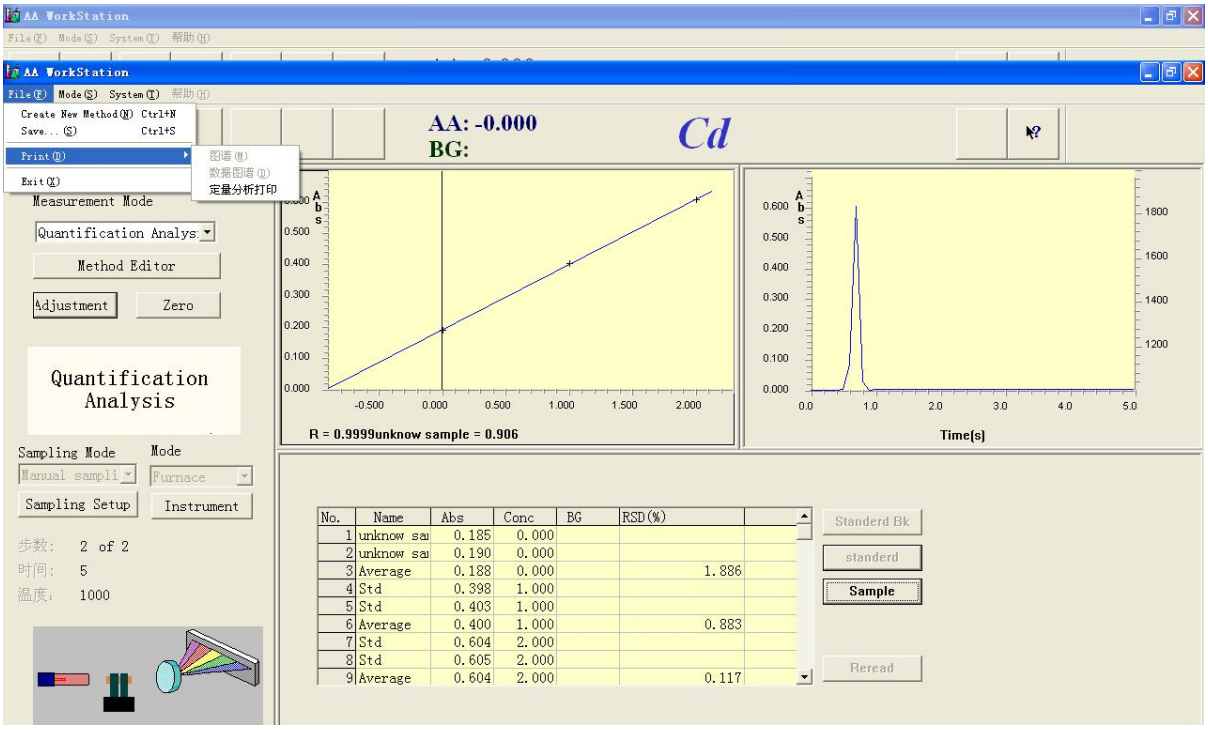


Figure 5-70

Printing

After the measurement,the result can be printed.The operating method is the following:

Click on the Print/Quantification Analysis in the file menu,an shown in the figure 5-71,display the “sample information” dialog,as shown in the figure 5-72



No.	Name	Abs	Conc	BG	RSD(%)
1	unknow sa	0.185	0.000		
2	unknow sa	0.190	0.000		
3	Average	0.188	0.000		1.886
4	Std	0.398	1.000		
5	Std	0.403	1.000		
6	Average	0.400	1.000		0.883
7	Std	0.604	2.000		
8	Std	0.605	2.000		
9	Average	0.604	2.000		0.117

Figure 5-71

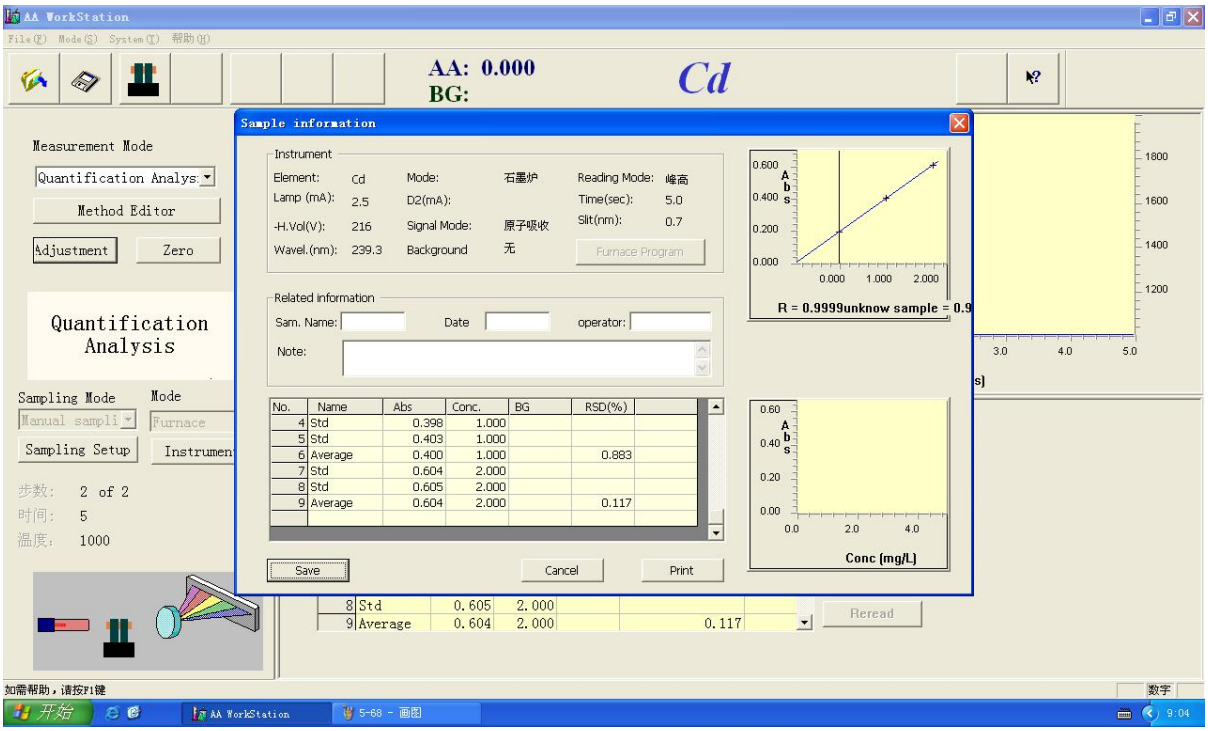


Figure 5-72

2.Press【Print】button,display the figure 5-73

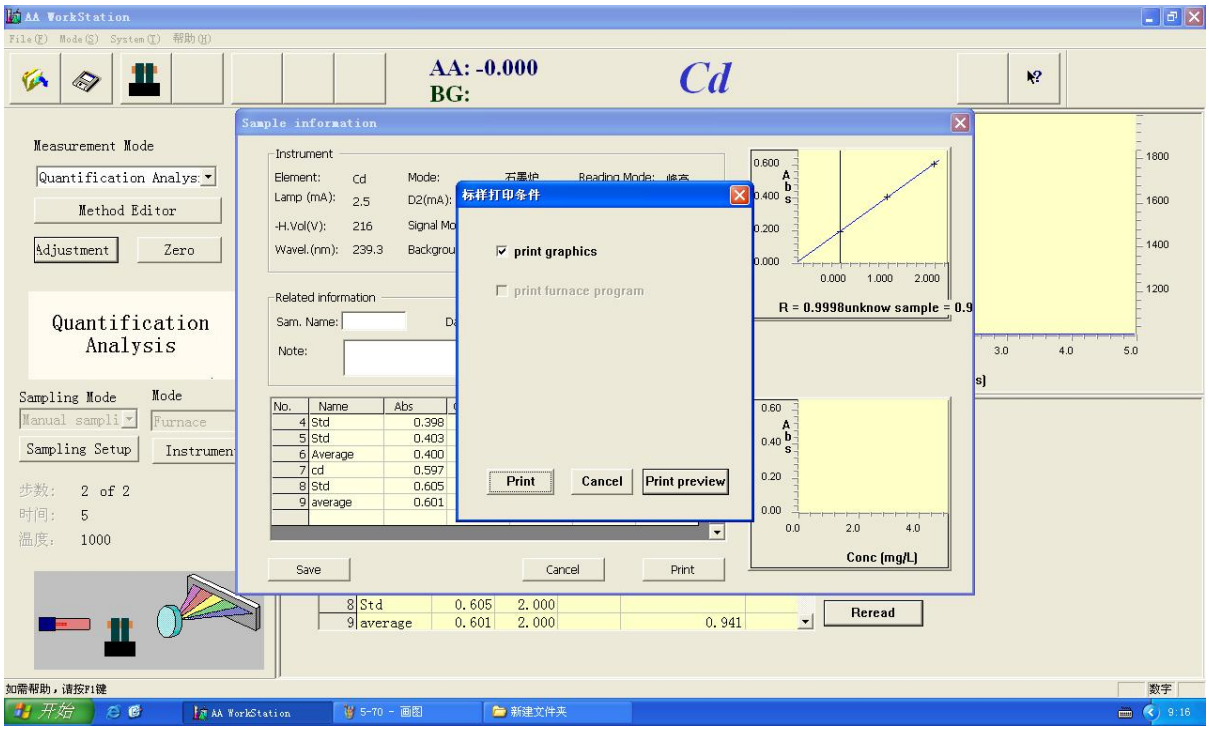


Figure 5-73

3.You can operate according to your need

Background-Correction

1. Take lamp Cd as an example,please first align lamps when you select the “AA-BG Ab” on the”Signal Mode”.After this press “Balance” to balance between the euterium lamp and element lamp,Figure 5-74

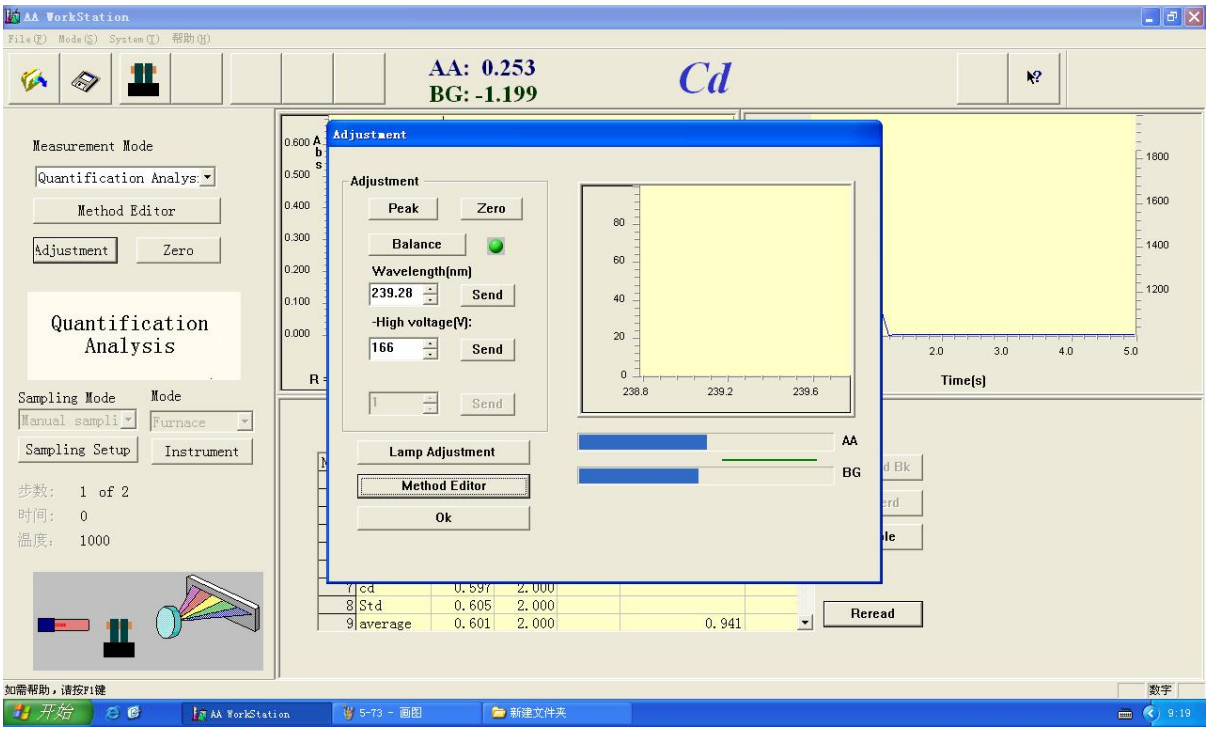


Figure 5-74

2. Press the “Balance”,Figure 5-75 pops up

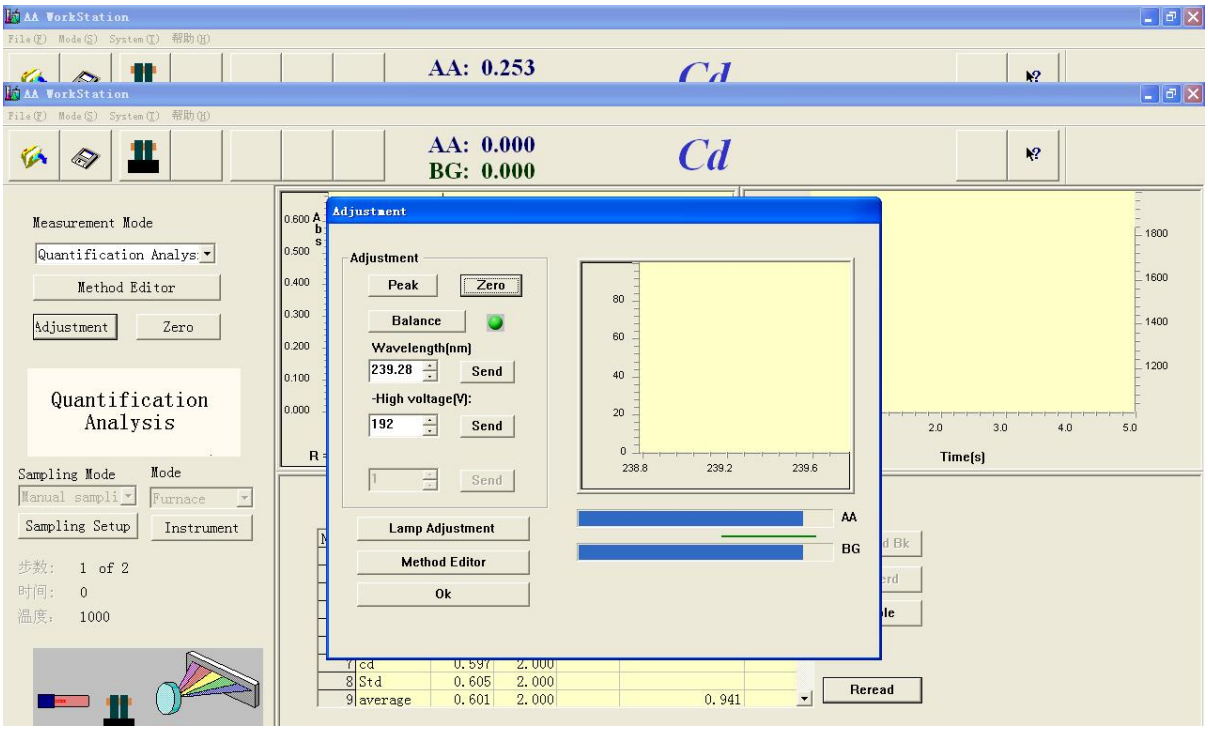


Figure 5-75

3. After balancing press “OK” to close the dialog box.,align lamps is over.
4. Now start to test samples,the method is the same as the “Automic Abs” of the “Signal Mode”

Self Mode

1. Set parameters according to the user’s requirements in the window of “Instrument Page”,see Figure 5-76a,(You must select the “self mode”)

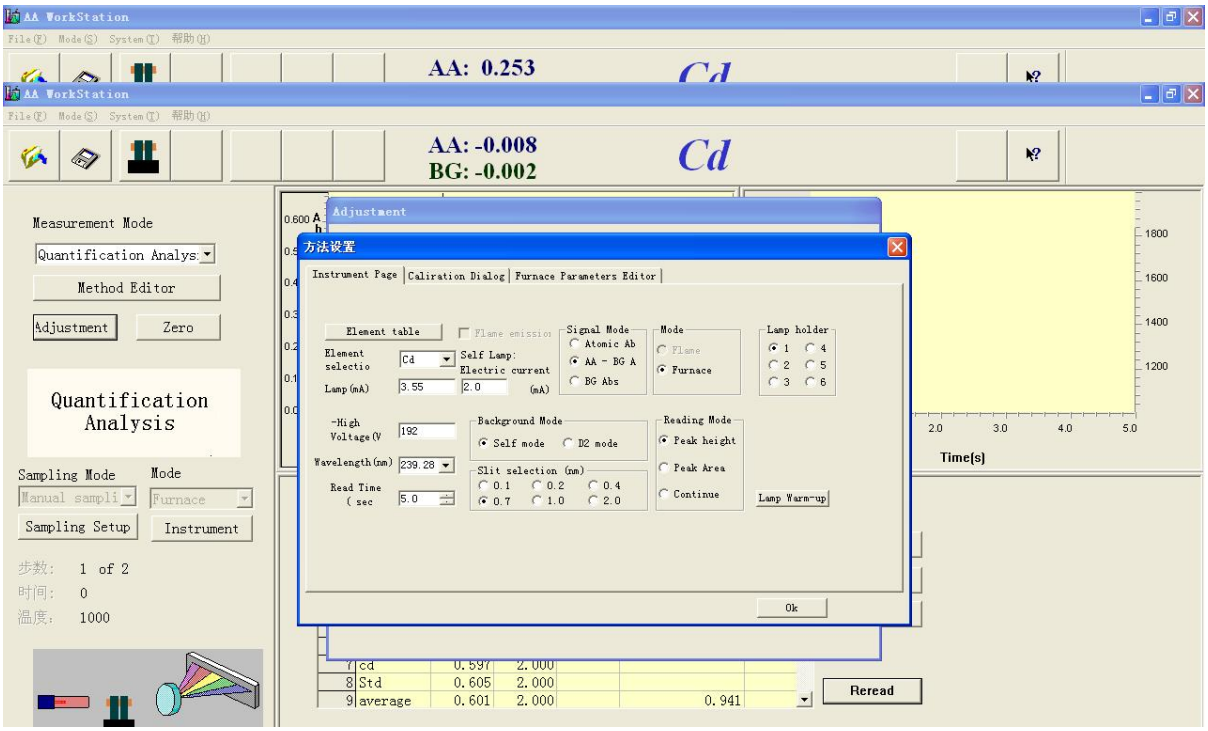


Figure 5-76a

2. Please first align lamps,see Figure 5-76,press “Balance” to balance between the background light and work light

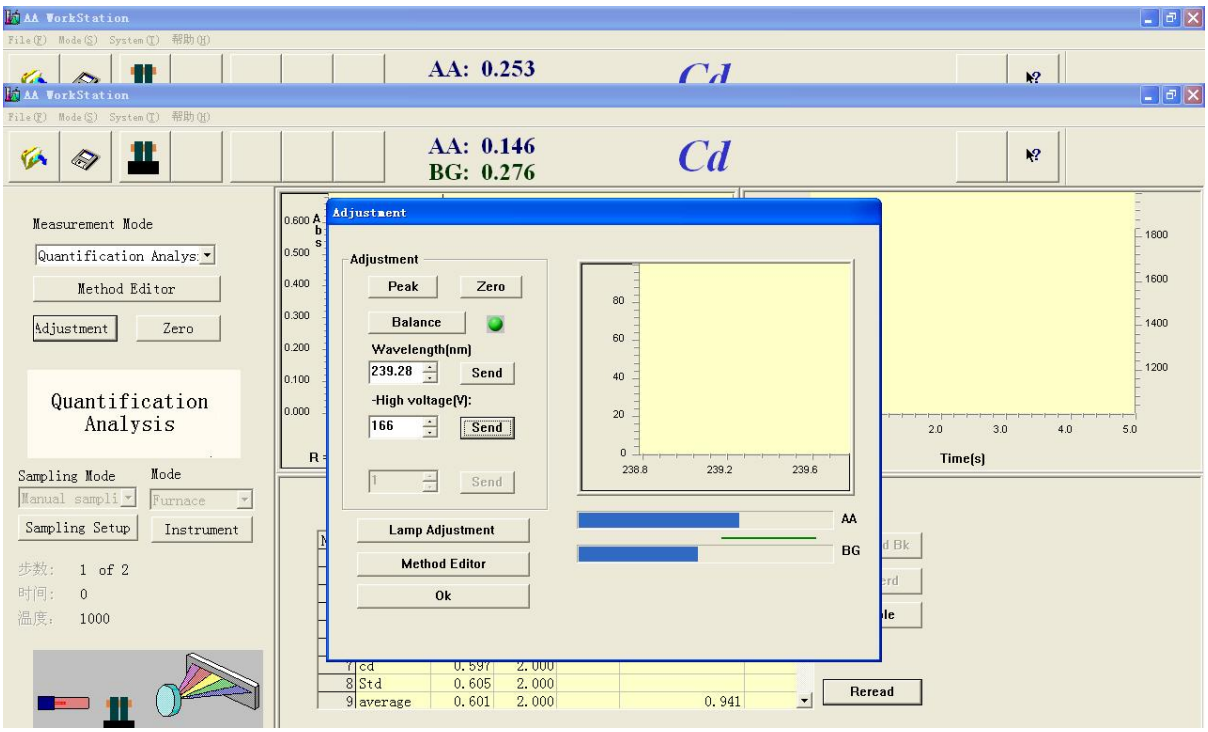


Figure 5-76

3.Press “Balance”,Figure 5-77 pops up

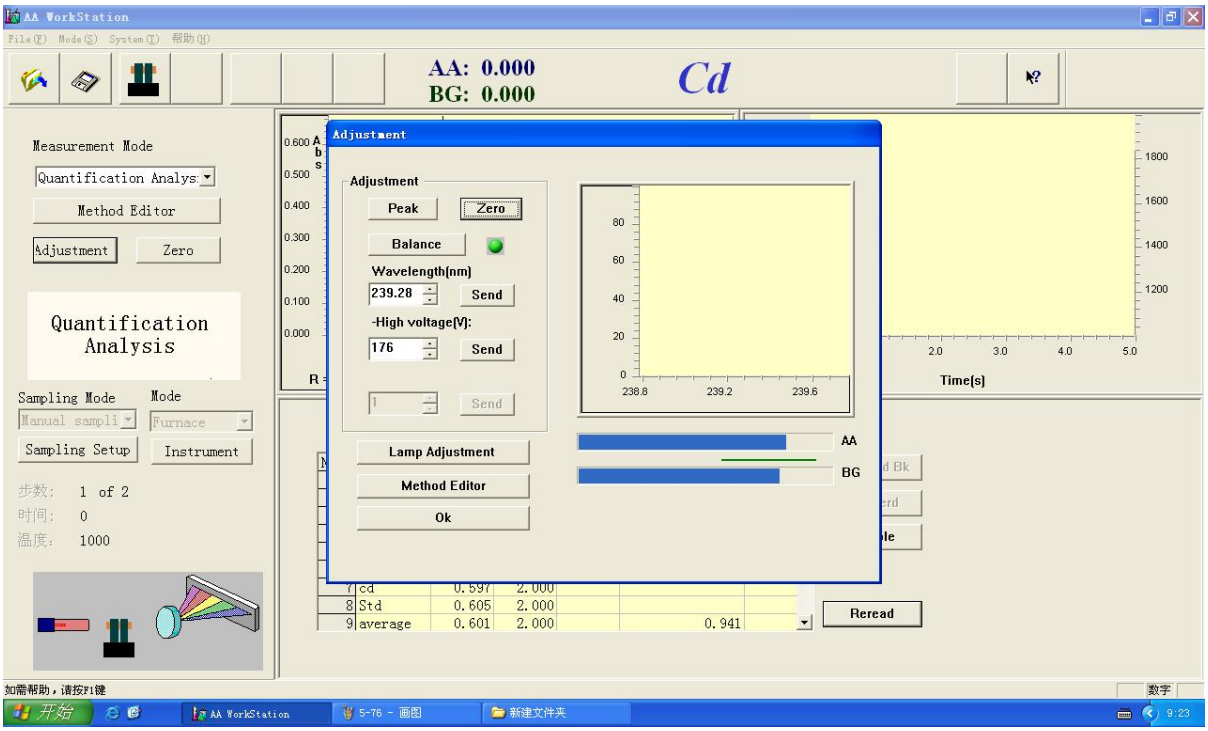


Figure 5-77

4.After balancing press “OK” to close the dialog box

5.Select a test mode you need to start testing samples.

Chapter 6 Call Data

When you call data you must note the corresponding test mode.

1. Select the “Call Data” from the file menu or press the open button on the toolbar,the Figure 6-2 pops up.

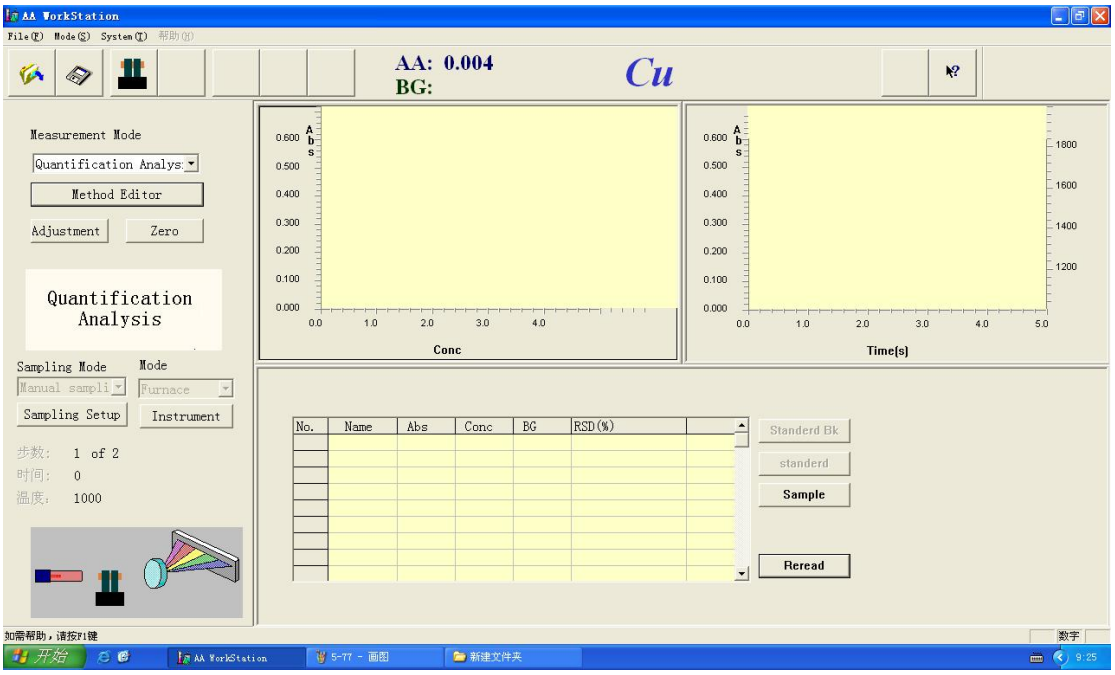


Figure 6-2

2. Select the file name as shown in Figure 6-3

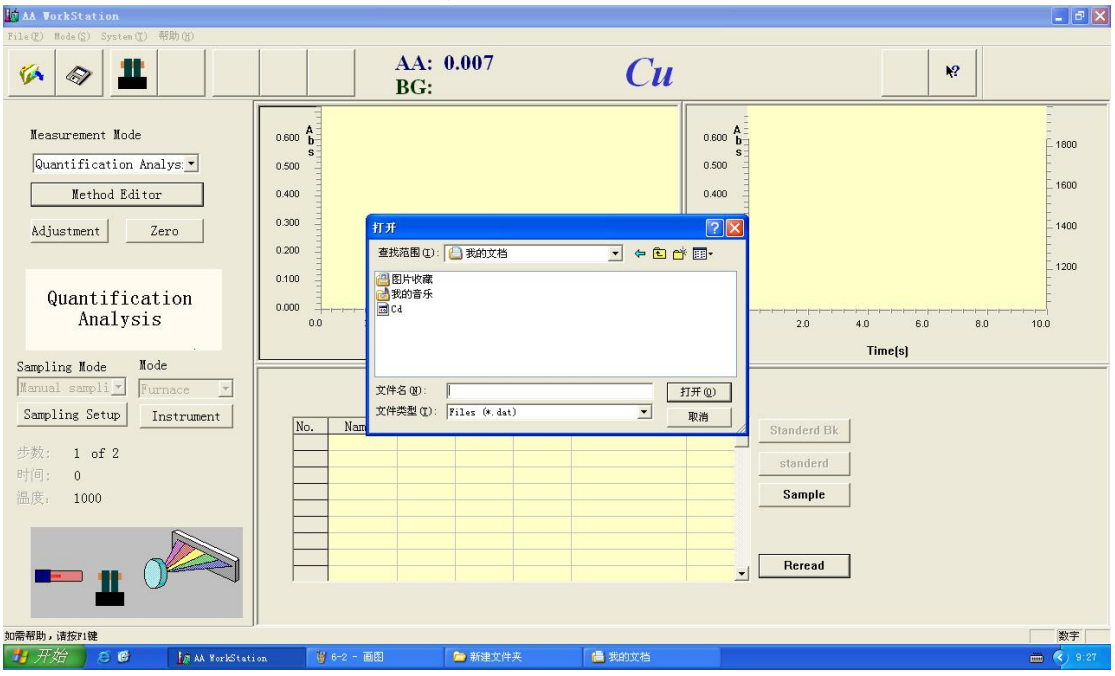


Figure 6-3

3. Press “Open” get the data has been saved,as shown in Figure 6-4,then can print it

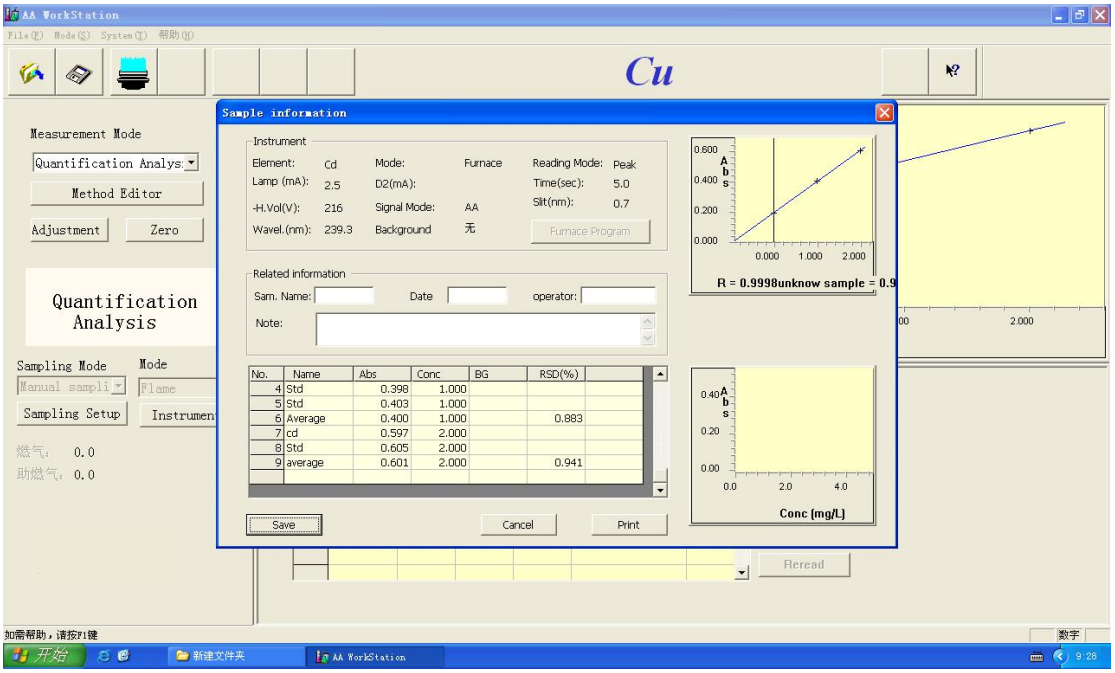

AA WorkStation
Cu
Measurement Mode
Quantification Analys
Method Editor
Adjustment
Zero
Quantification Analysis
Sampling Mode
Mode
Manual sampli
Flame
Sampling Setup
Instrumen
燃气: 0.0
助燃气: 0.0
Sample information
Instrument
Element: Cd
Lamp (mA): 2.5
-H.Vol(V): 216
Wavel.(nm): 239.3
Mode:
D2(mA):
Signal Mode: AA
Background 无
Furnace
Reading Mode: Peak
Time(sec): 5.0
Slit(nm): 0.7
Furnace Program
Related information
Sam. Name:
Date
operator:
Note:
No. Name Abs Conc BG RSD(%)
4 Std 0.398 1.000
5 Std 0.403 1.000
6 Average 0.400 1.000 0.883
7 cd 0.597 2.000
8 Std 0.605 2.000
9 average 0.601 2.000 0.941
Save
Cancel
Print
Reread
R = 0.9998unknow sample = 0.9
Conc (mg/L)
如需帮助，请按F1键
数字
开始
新建文件夹
AA WorkStation

Figure 6-4