

## **User Manual**

# **Inductively Coupled Plasma Mass Spectrometry**

## **DW-ICP-MS2000**



Please read operating manual before installation and operation.

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## Use Manual of ICP-MS

### 1. Starting up Instrument

Turn on water tank power, solid-state power, RF power and argon reducing valve; organize the sample feed tube and waste tube on peristaltic pump. Immerse sample feed tube into 1% nitric acid solution, and then set “Cooling Gas” to 13, “Auxiliary Gas” to 0.75.

Name	Set Value	Reflect Value
+ Ion Parameter (V)		
- Ion		
Cooling Gas	13	18
Auxiliary Gas	<b>0.75</b>	1.25
Nebulizer Gas	0	0
RF Power	<b>0</b>	0
Peristaltic Pump Speed	<b>0</b>	
+ Torch Position(mm)		
+ Switch		

## 2. Ignition

### 2.1 Matching

Set “RF Power” to “250”, “Nebulizer Gas” to 2, “RF Switch” to “on”, then ion power will do the matching; a sound will indicate matching succeeded. At this time, set “RF Switch” to “off”.

Name	Set Value	Reflect Value
+ Ion Parameter (V)		
- Ion		
Cooling Gas	13	10
Auxiliary Gas	0.75	1.25
Nebulizer Gas	2	2
RF Power	250	0
Peristaltic Pump Speed	0	
+ Torch Position (mm)		
- Switch		
Angle Valve	Off	Off
Pneumatic Valve	Off	Off
Molecular Pump	Off	On
Mechanical Pump	Off	Off
Peristaltic Pump	Off	Off
Water Switch	Off	On
RF Switch	On	Off
Atomizer Chamber	Off	Off

## 2.2 Ignition

After matching, set “RF Power” to “950”, “Nebulizer Gas” to “0”; set “RF Switch” to “On” until the “Reflect Value” of “Nebulizer Gas” displays “0”, ignite the instrument at this time. If ignition fails, go back to step 1 to rematch.

Name	Set Value	Reflect Value
+ Ion Parameter (V)		
- Ion		
Cooling Gas	13	10
Auxiliary Gas	0.75	1.25
Nebulizer Gas	0	2
RF Power	950	0
Peristaltic Pump Speed	0	
+ Torch Position (mm)		
- Switch		
Angle Valve	Off	Off
Pneumatic Valve	Off	Off
Molecular Pump	Off	On
Mechanical Pump	Off	Off
Peristaltic Pump	Off	Off
Water Switch	Off	On
RF Switch	On	Off
Atomizer Chamber	Off	Off

### 2.3 Setting RF Power and Nebulizer Gas

Set “RF Power” to “1300” after ignition succeeded; after flame stabilized, change the set value of “Nebulizer Gas” by clicking up and down arrow, with maximum value of 0.9.

Name	Set Value	Reflect Value
⊕ Ion Parameter (V)		
⊖ Ion		
Cooling Gas	13	10
Auxiliary Gas	0.75	1.25
Nebulizer Gas	0.1	2
RF Power	1300	0
Peristaltic Pump Speed	0	
⊕ Torch Position (mm)		
⊖ Switch		
Angle Valve	Off	Off
Pneumatic Valve	Off	Off
Molecular Pump	Off	On
Mechanical Pump	Off	Off
Peristaltic Pump	Off	Off
Water Switch	Off	On
RF Switch	On	On
Atomizer Chamber	Off	Off

### 3. Tune

3.1 After ignition, turn on “Peristaltic Pump”, “Mechanical Pump” successively, and then set the parameters in “Ion Parameter” (excluding “PulseCount Detector” and “Analog Detector”); turn on “Pneumatic Valve” after setting completed.

Name	Set Value	Reflect Value
<input type="checkbox"/> Ion Parameter (V)		
Extraction	-200	-378
Lens1	<b>-1000</b>	-1000
Lens2	-85	-69
Lens3	-185	-200
Focus	7	11
D1	-55	-91
D2	-35	-140
DA	-120	-25
Hexapole Bias	<b>0</b>	
Pole Bias	<b>0</b>	
Hexapole Width	<b>1</b>	
PulseCount Detector	950	0
Analog Detector	-1750	0
PLS	100	100
Atomizer Chamber Temperatur	<b>0</b>	
OutA	110	110
OutB	<b>0</b>	
OutC	20	20
OutD	<b>0</b>	
<input type="checkbox"/> Ion		
Cooling Gas	13	10
Auxiliary Gas	<b>0.75</b>	1.25
Nebulizer Gas	0.1	2
RF Power	1300	1300
Peristaltic Pump Speed	<b>0</b>	
<input type="checkbox"/> Torch Position (mm)		
Torch Vertical Position	76	2
Torch Horizontal Position	32	2
Sample Depth	12	2
<input type="checkbox"/> Switch		

3.2 Set the parameters of “PulseCount Detector” and “Analog Detector” by clicking up and down arrow to increase or decrease by “-500” and “200” respectively; the parameter of “Analog Detector” shall not be lower than “-1900”, and that of “PulseCount Detector” shall not be larger than “1000”.

### 3.3 Choosing detector type



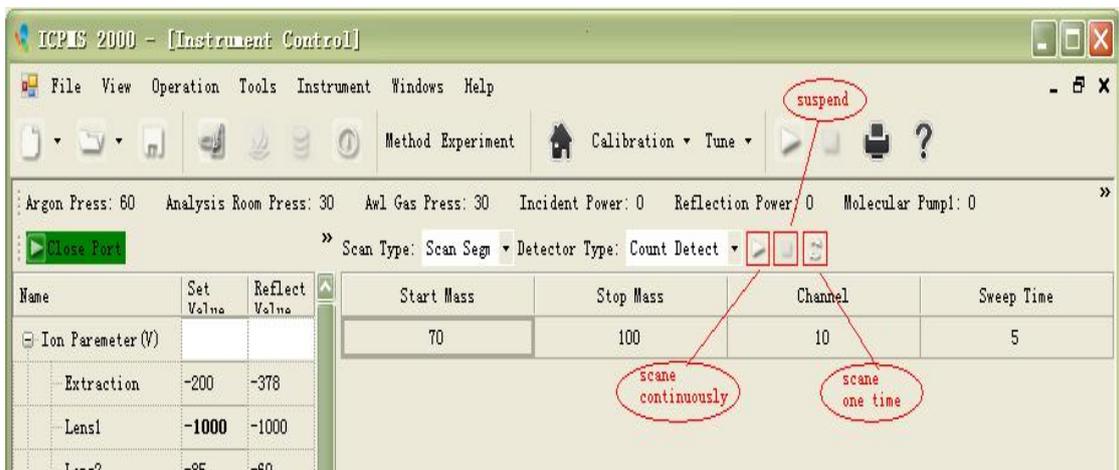
### 3.4 Setting the start mass of scanning element



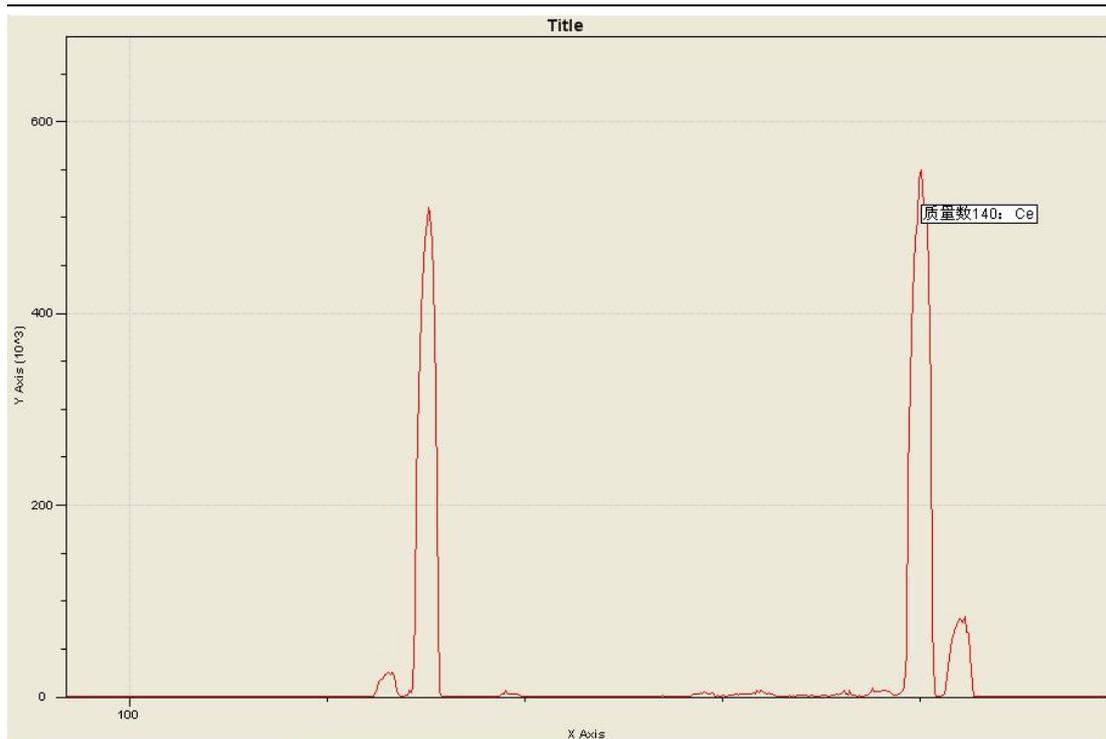
### 3.5 Setting sweep time



### 3.6 Scan



Scan Spectrum:

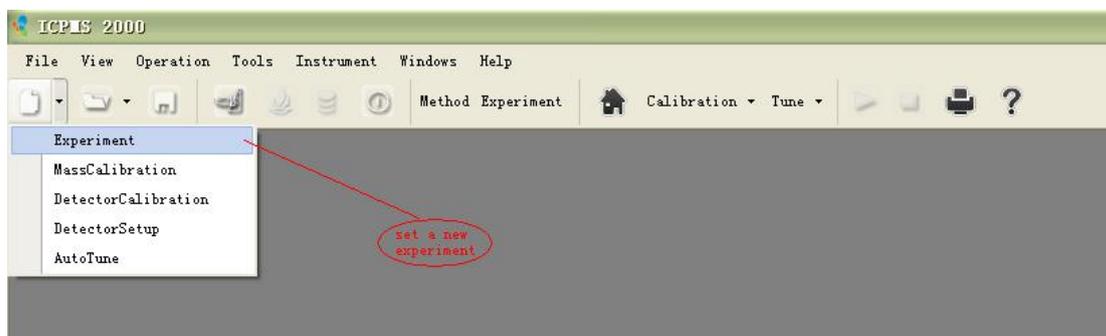


8. Use tuned liquid to optimize various “Ion Parameter”, to reach optimum sensitivity.

## 4. Experiment

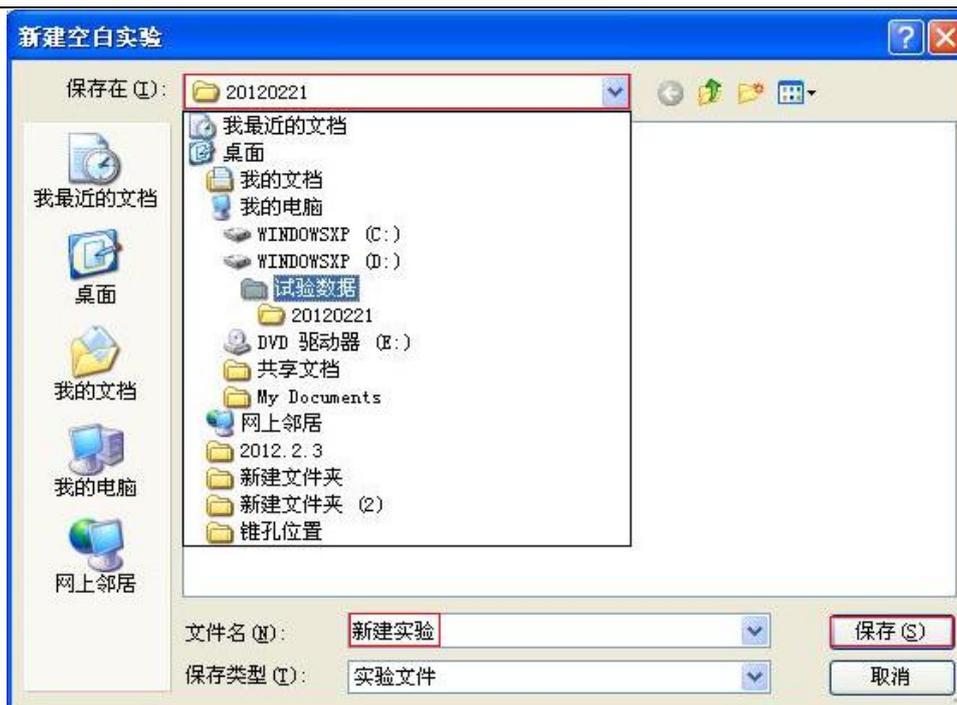
### 4.1 Set a New Experiment

Click “Experiment” to set a new experiment.



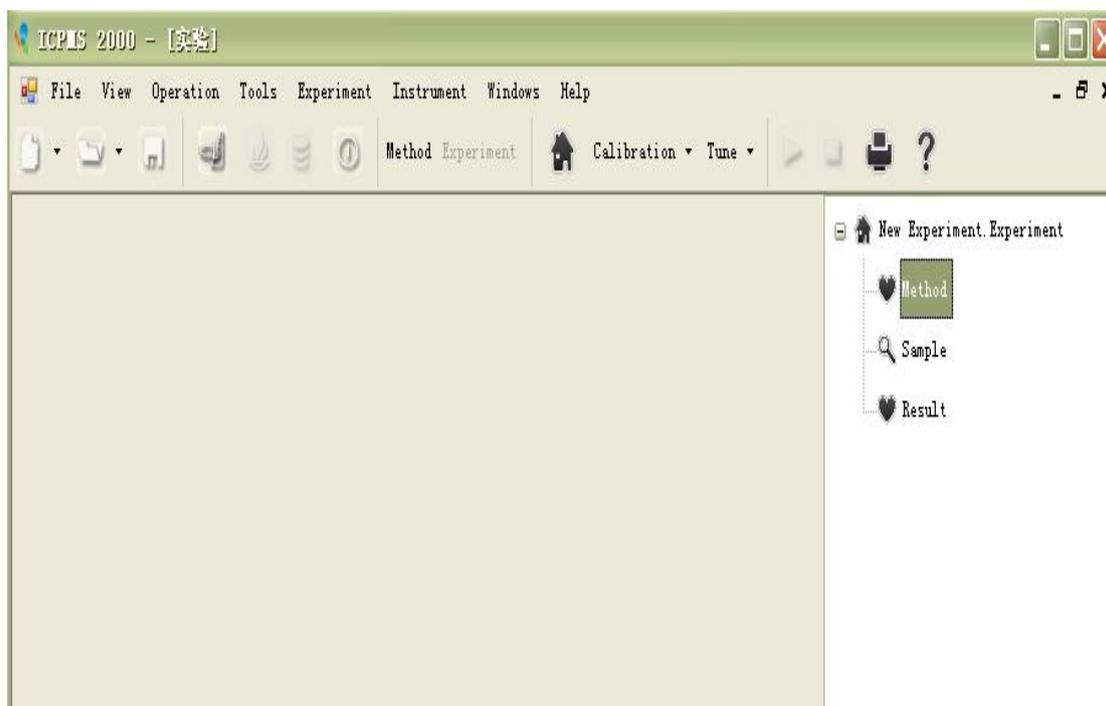
### 4.2 Choose save path and name of test

Choose the save path of experiment document, set document name and then save.

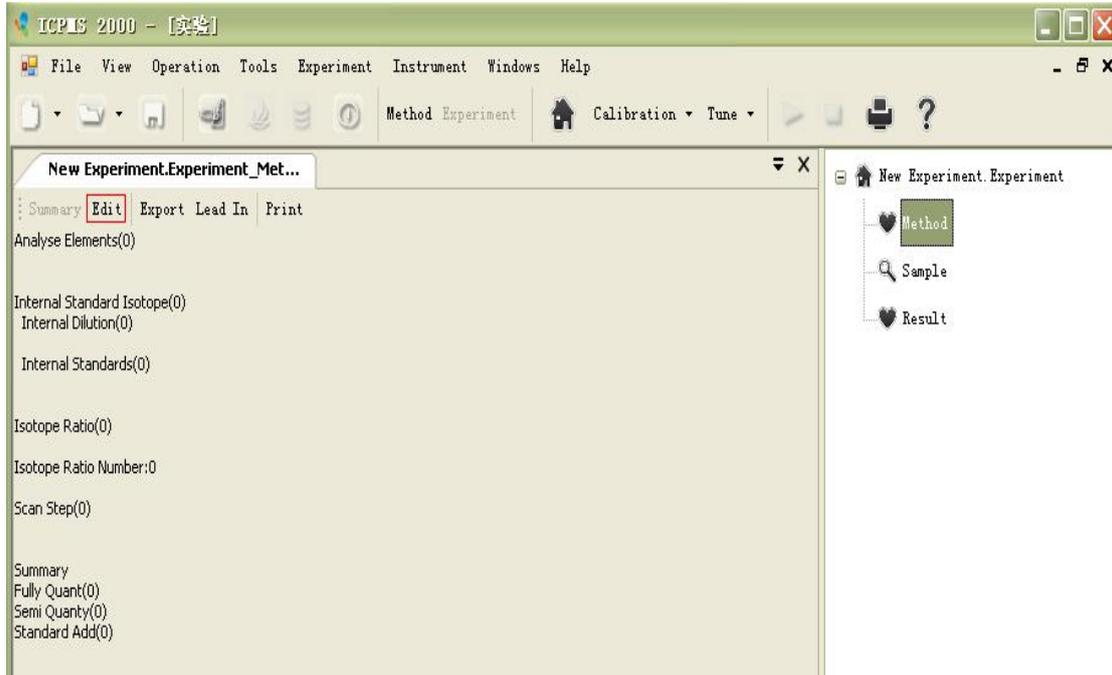


#### 4.3 Edit Method

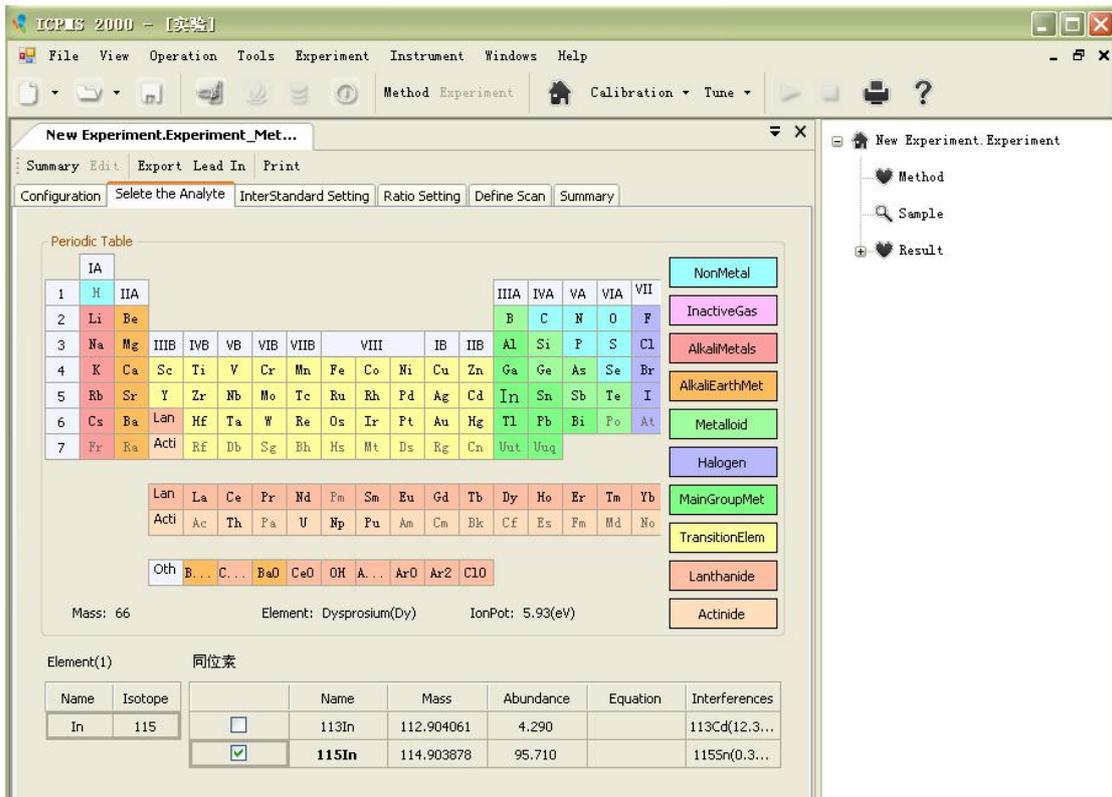
Double click "Method"



Click “Edit”.

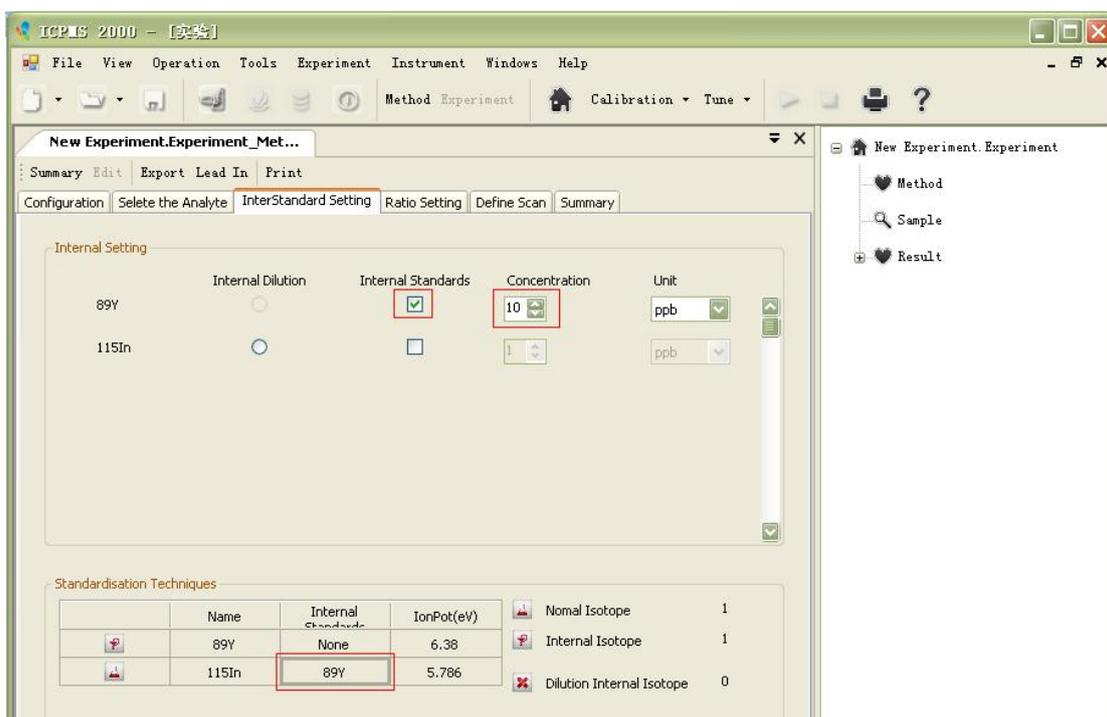


#### 4.4 Select the Analyte



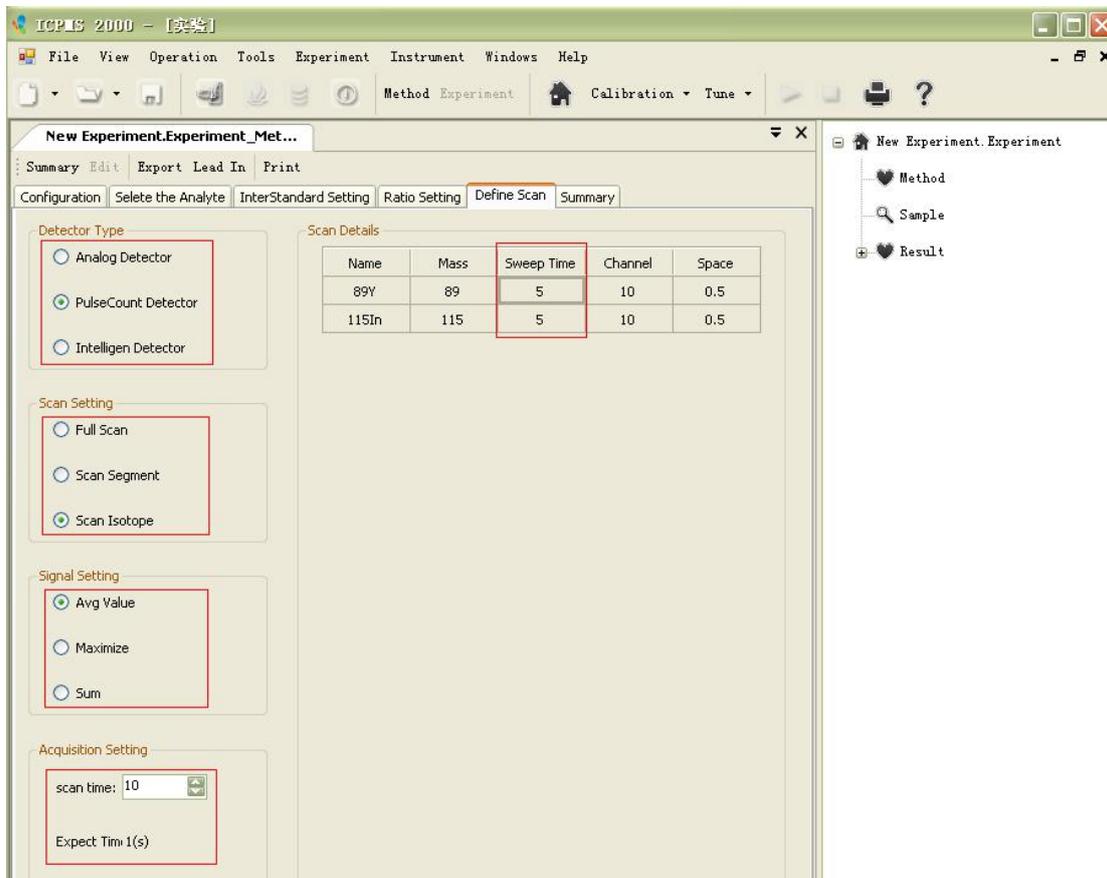
#### 4.5 Set Internal Standard

If adopting internal standard method in experiment, it is necessary to choose internal standard element for analyte. Click “InterStandard Setting”, choose internal standard element to be used, and set its concentration.

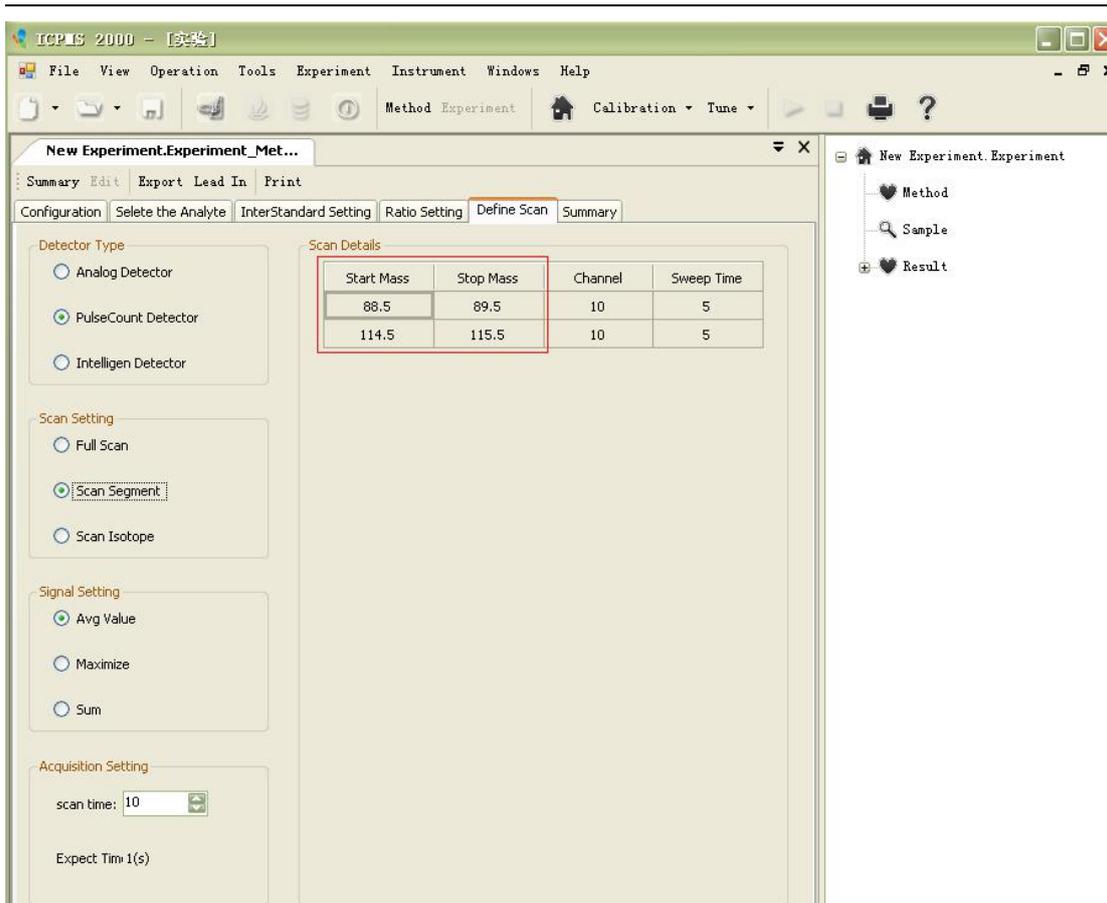


#### 4.6 Scan Setting

Choose detector type, scan setting, signal setting, acquisition setting and sweep time.

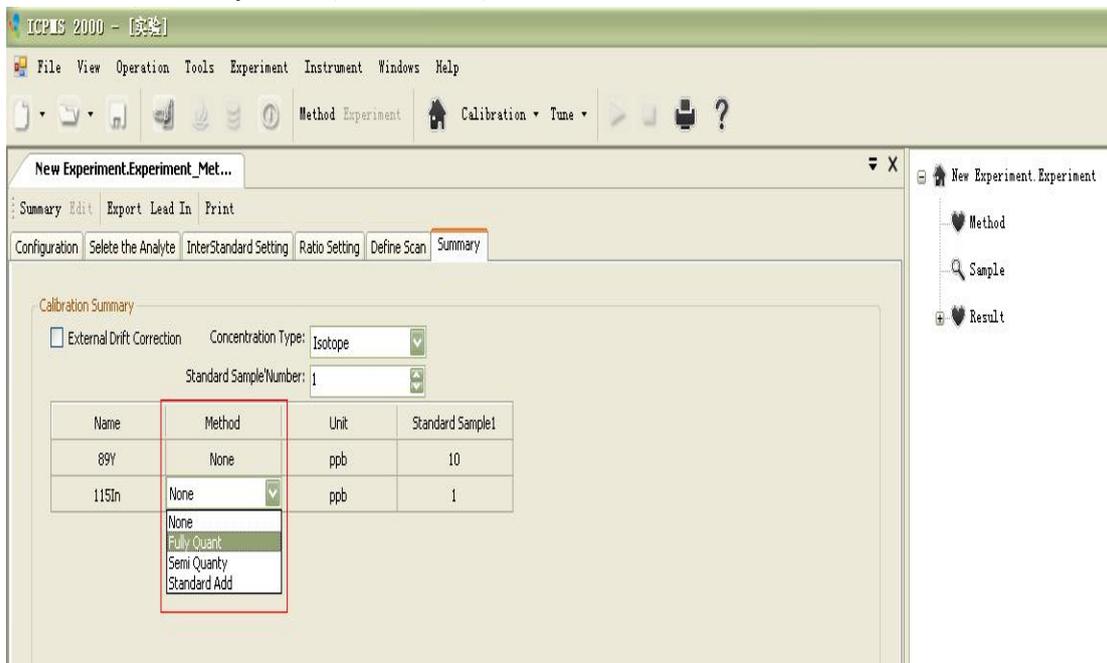


In Scan Segment, set the Start Mass and Stop Mass of analyte.

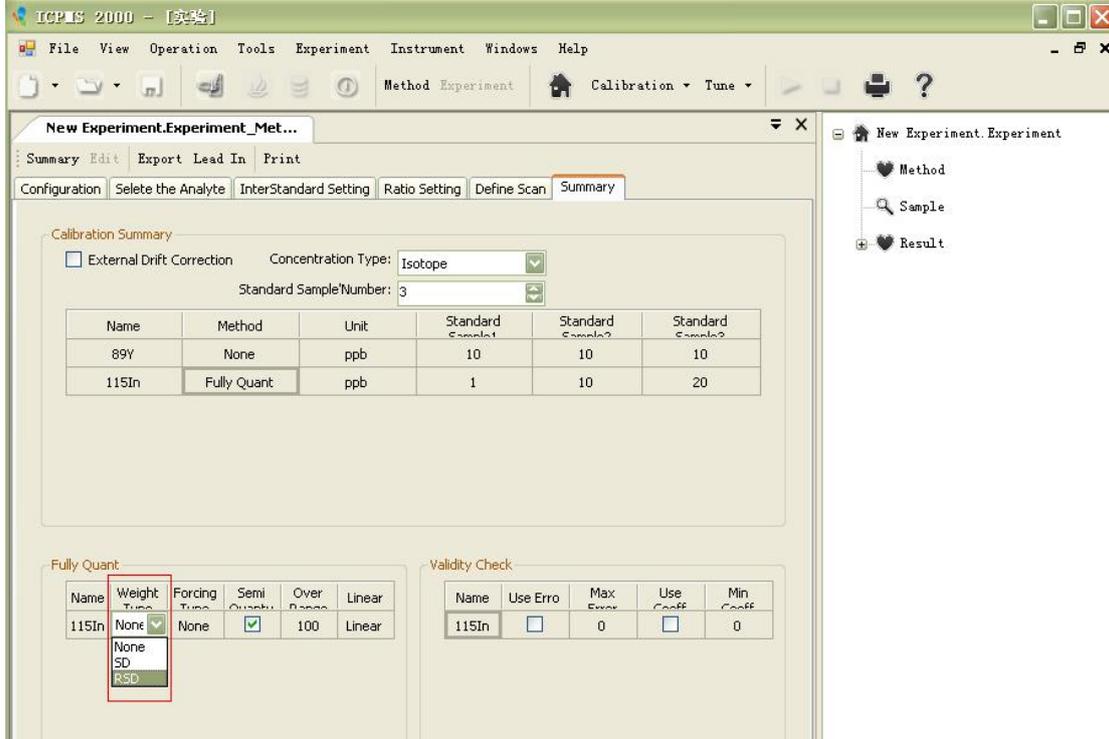


#### 4.7 Summary

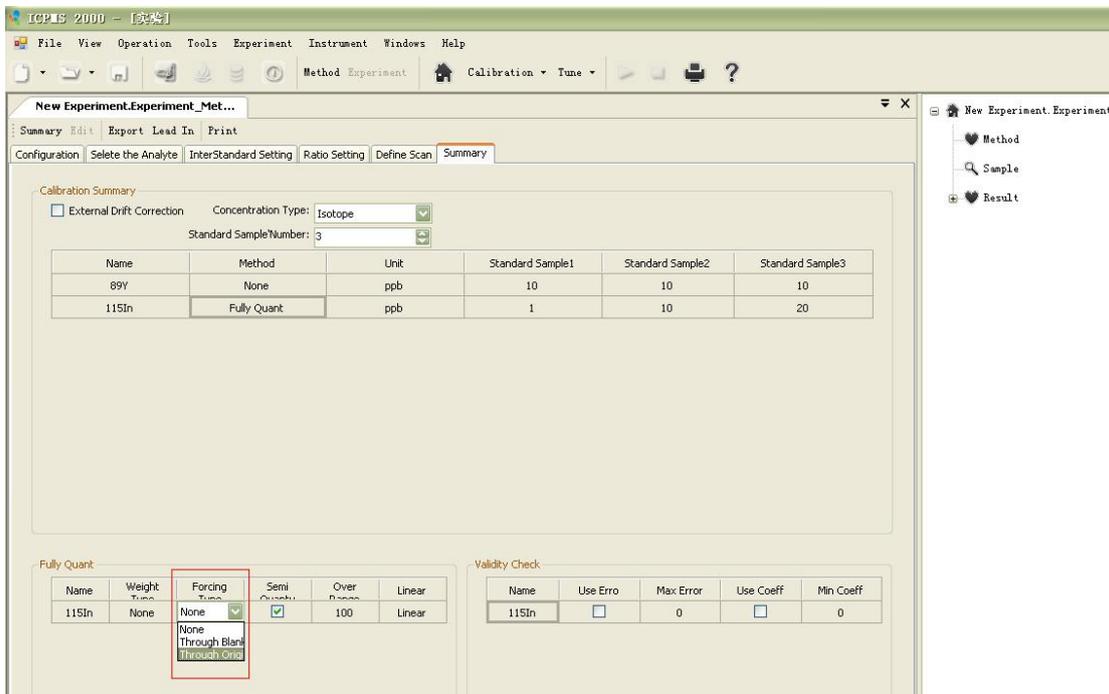
Define summary: Full Quant, Semi Quant, and Standard Add.



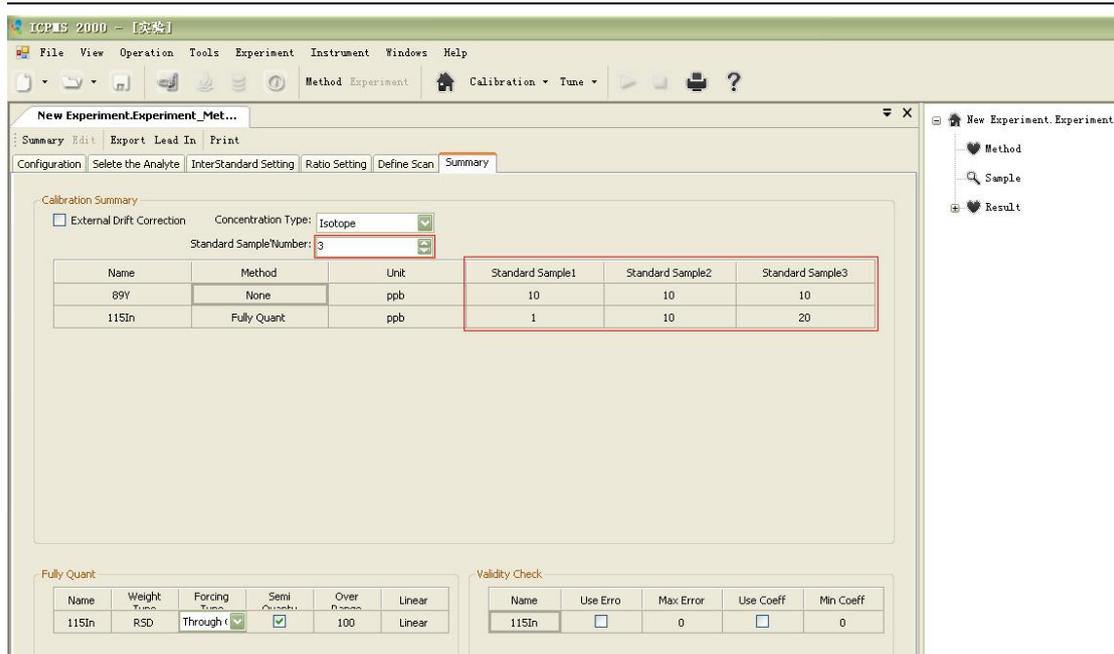
When choosing Full Quant or Standard Add, the selectable Weight Type is: none, SD (absolute deviation), RSD (relative standard deviation).



Choose "Forcing Type":



Set the number and concentration of standard sample.

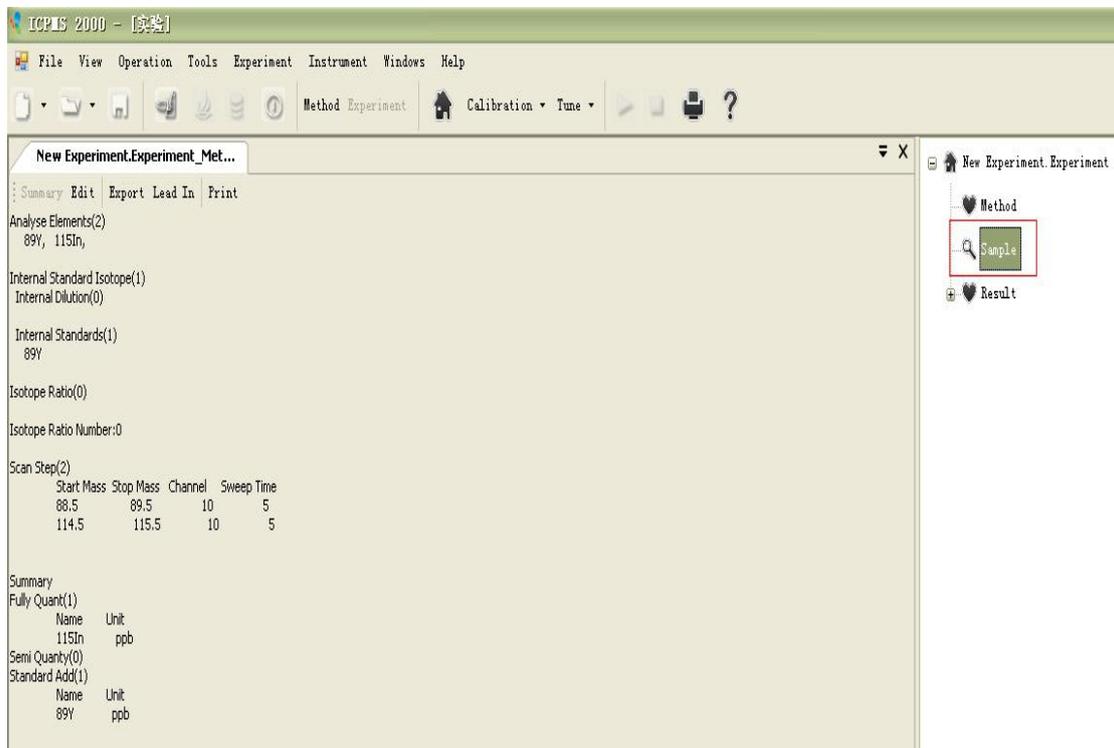


#### 4.8 Save

This function has been deleted.

#### 4.9 Sample Setting

Double click "Sample" in right pane.



Set and input sample number, and then click "Set".

ICP-AES 2000 - [实验]

File View Operation Tools Experiment Instrument Windows Help

Method Experiment Calibration Tune

New Experiment.Experiment\_Sample

Number of Unknown Sample: 3 Set Add Sample Export Lead In sample style: 手动进样

ID	Name	SampleType	Survey Time	Actual Weight	Actual Weight <sub>1 to 3</sub>	Actual Voltage	Actual Vol Unit	Dilution Factor	Blank Sample
1	Blank	Blank	1	1	g	1	ml	1	
2	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
3	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
4	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
5	Unknown1	Unknown	1	1	g	1	ml	1	
6	Unknown2	Unknown	1	1	g	1	ml	1	
7	Unknown3	Unknown	1	1	g	1	ml	1	

Revise sample name.

ICP-AES 2000 - [实验]

File View Operation Tools Experiment Instrument Windows Help

Method Experiment Calibration Tune

New Experiment.Experiment\_Sample

Number of Unknown Sample: 3 Set Add Sample Export Lead In sample style: 手动进样

ID	Name	SampleType	Survey Time	Actual Weight	Actual Weight <sub>1 to 3</sub>	Actual Voltage	Actual Vol Unit	Dilution Factor	Blank Sample
1	Blank	Blank	1	1	g	1	ml	1	
2	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
3	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
4	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
5	Unknown1	Unknown	1	1	g	1	ml	1	
6		Unknown	1	1	g	1	ml	1	
7	Unknown3	Unknown	1	1	g	1	ml	1	

Choose "Blank"

ICP-AES 2000 - [实验]

File View Operation Tools Experiment Instrument Windows Help

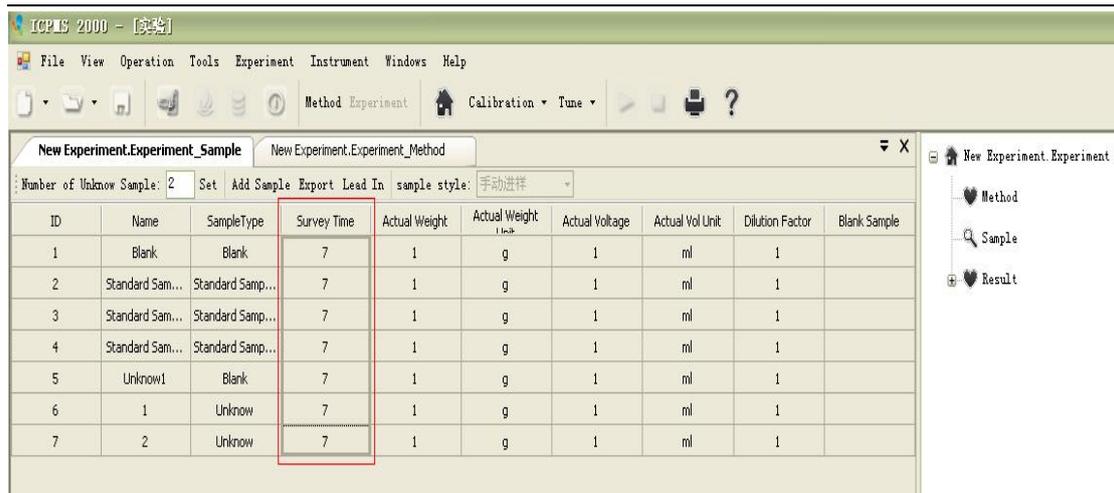
Method Experiment Calibration Tune

New Experiment.Experiment\_Sample

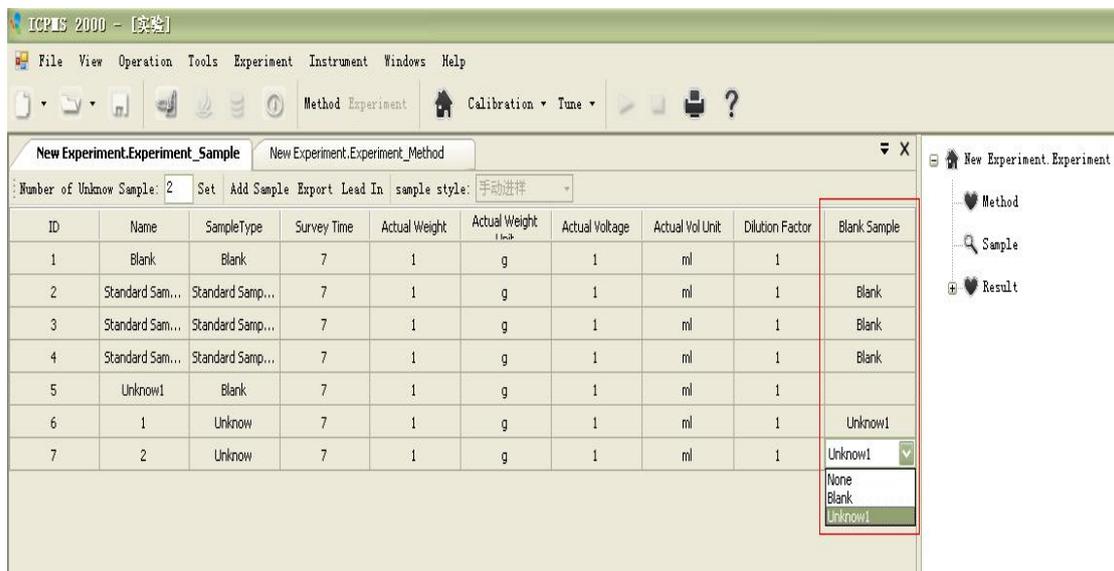
Number of Unknown Sample: 3 Set Add Sample Export Lead In sample style: 手动进样

ID	Name	SampleType	Survey Time	Actual Weight	Actual Weight <sub>1 to 3</sub>	Actual Voltage	Actual Vol Unit	Dilution Factor	Blank Sample
1	Blank	Blank	1	1	g	1	ml	1	
2	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
3	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
4	Standard Sam...	Standard Samp...	1	1	g	1	ml	1	
5	Unknown1	Unknown	1	1	g	1	ml	1	
6	1	Blank	1	1	g	1	ml	1	
7	Unknown3	Standard Sample1	1	1	g	1	ml	1	

Input "Survey Time" after double clicking cell.

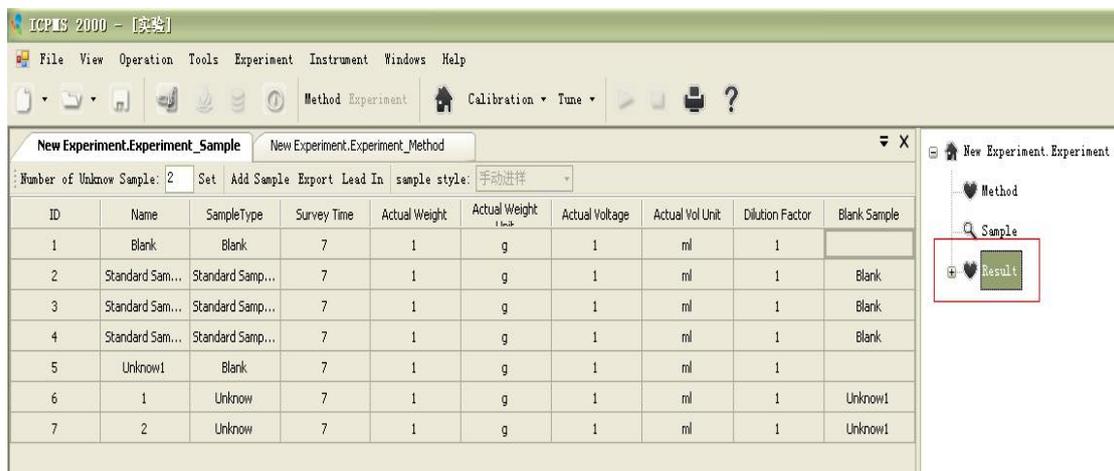


Edit Standard Blank Sample and Blank Sample based on “Forcing Type”.

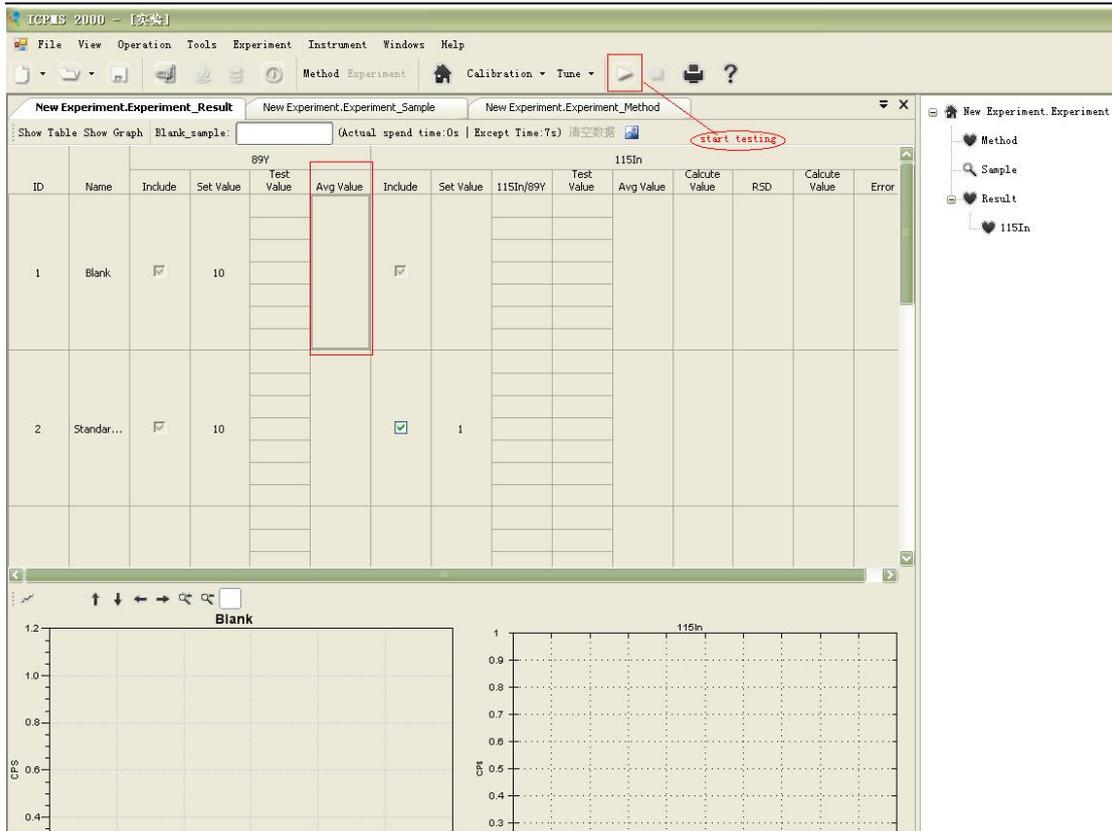


#### 4.10 Double Click “Result” to Start Test

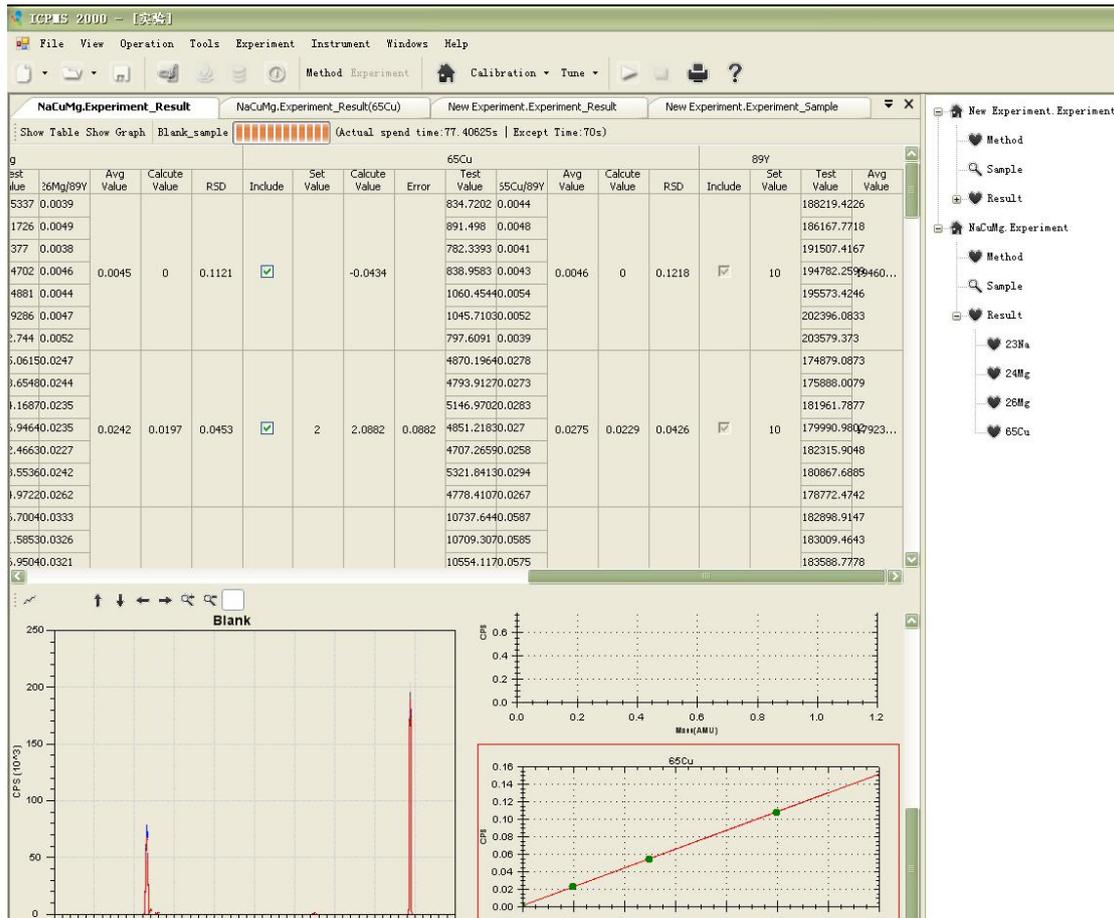
Double click “Result”, jump to test result interface.



Click the sample to be tested; if it is blank, click “start testing” button to test blank solution.



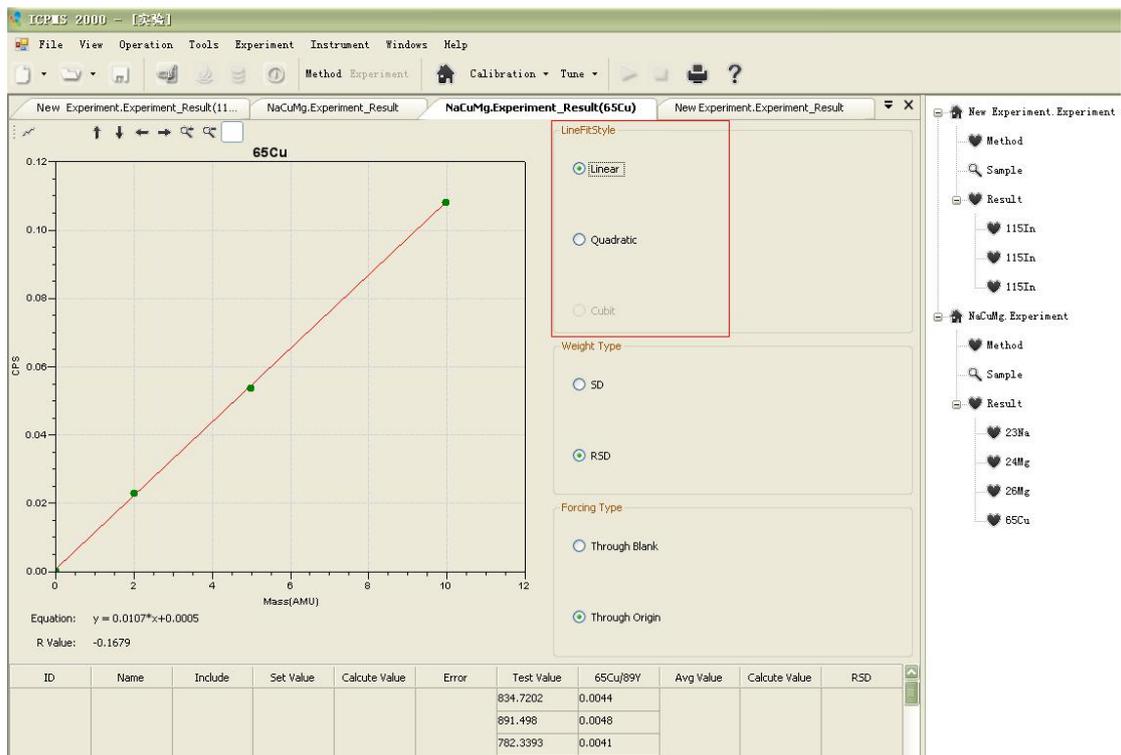
After testing standard solution, software delivers standard working curve of analyte automatically.



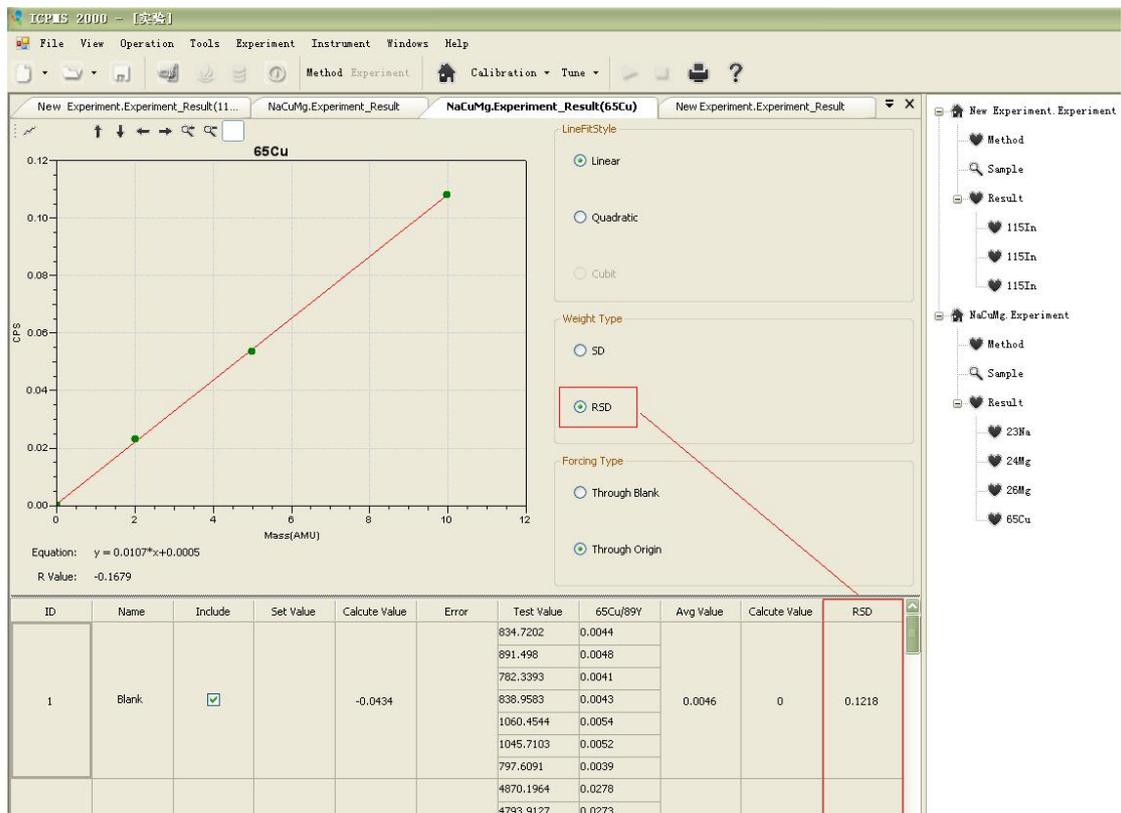
#### 4.11 Details on Working Curve

Double click the analyte below “Result” in right pane to display the details of its working curve; choose proper LineFitStyle, Weight Type and Forcing Type, with specific setting as follows:

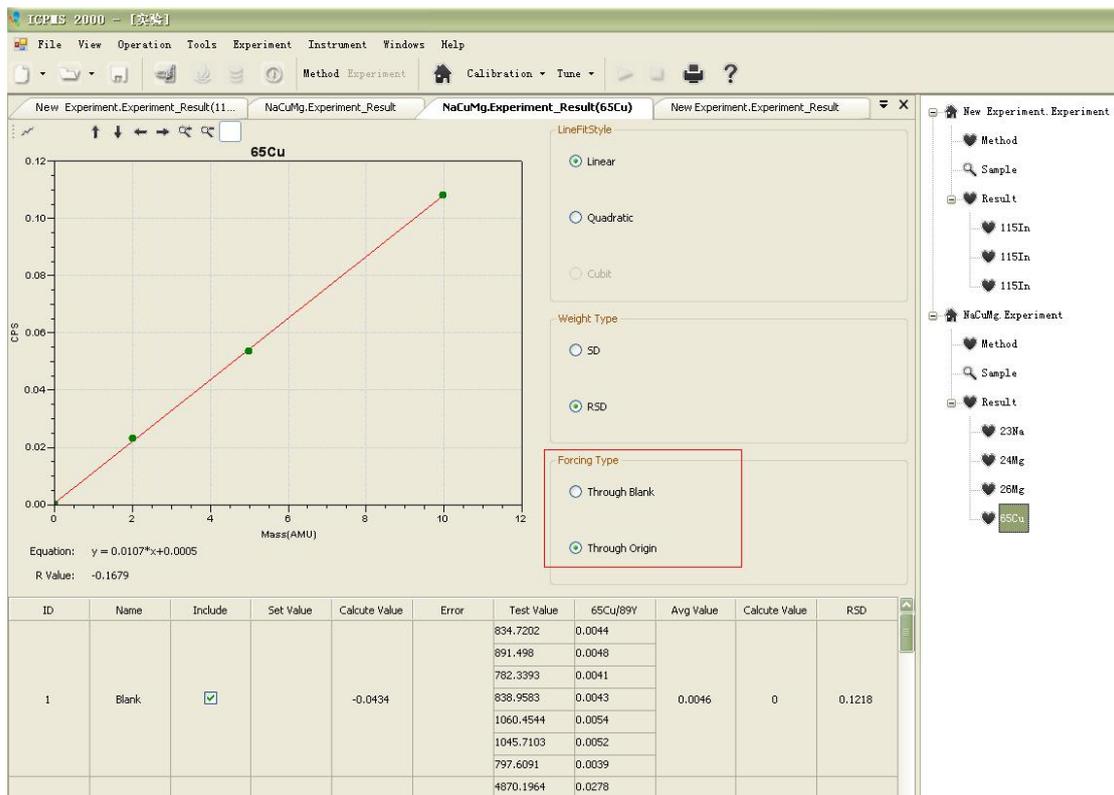
Choose LineFitStyle:



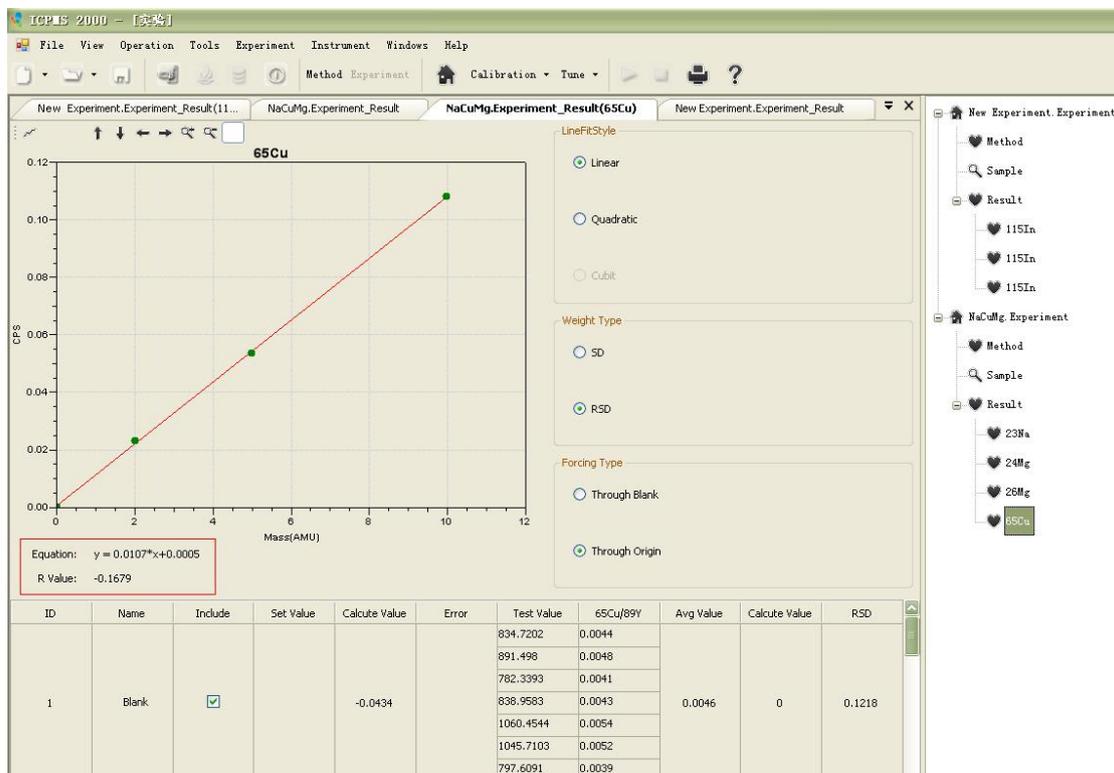
Choose "Weight Type":



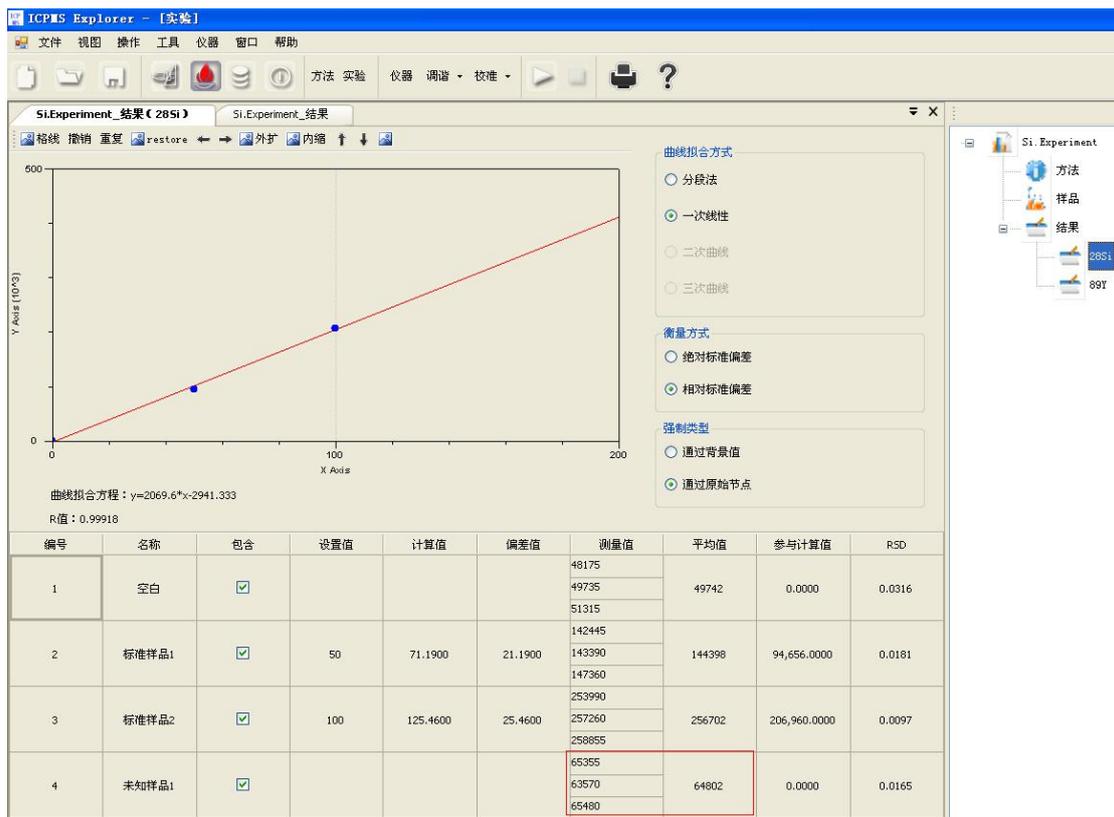
Choose between "Through Blank" and "Through Origin":



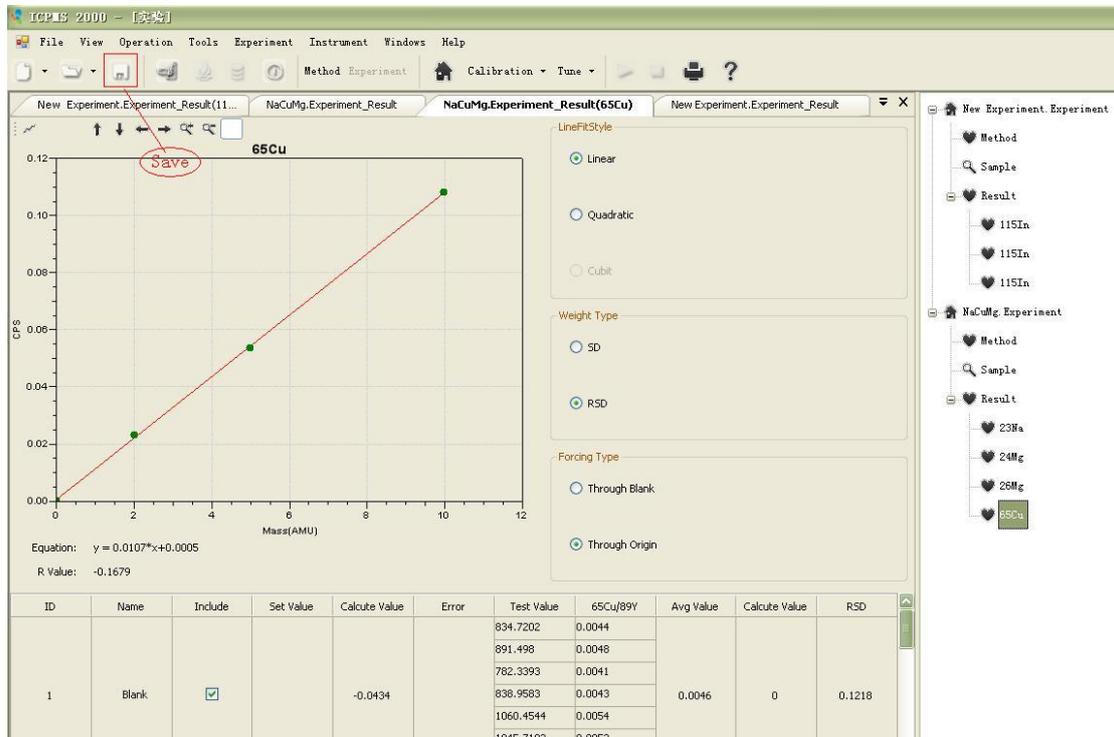
According to selected conditions, the software will display curve fitting equation and R-value:



Based on curve fitting equation, software will convert intensity of analyte to sample concentration:



4.12 Save and Open Saved Experiment  
After test, click “Save” button to save experiment data.

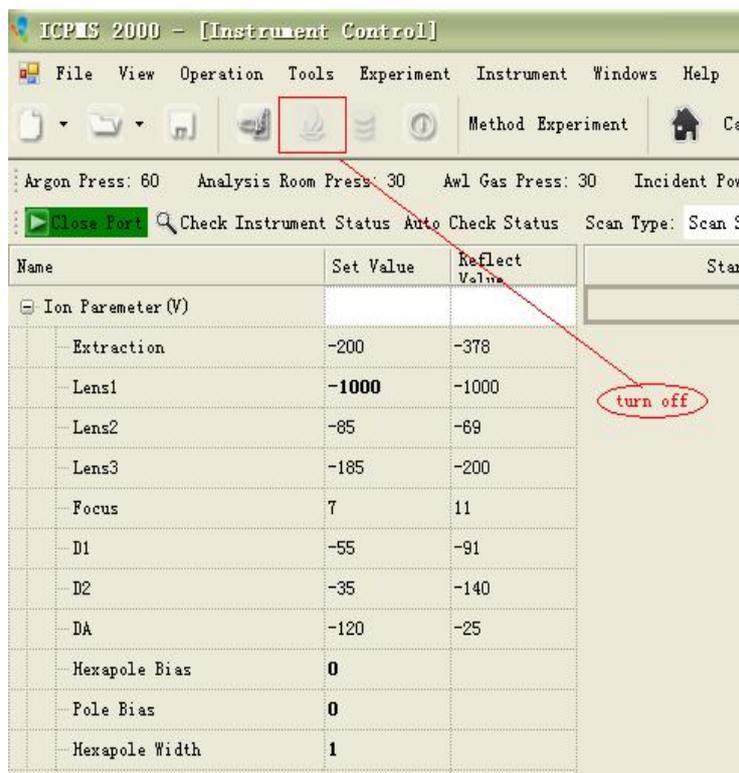


Open saved experiment data.



## 5. Turn off Instrument

1. Set "Pneumatic Valve" and "Mechanical Pump" to "Off"; set the value of "Extraction", "Lens 1" and "Lens 2" to "0" under "Ion Parameter", then set "RF Switch" to "Off" to shut down, or click "Turn Off" button in tool bar directly.



ICPIS 2000 - [Instrument Control]

File View Operation Tools Experiment Instrument

Method Exper

Argon Press: 13.11MPa Analysis Room Press: 1.30+5mbar A

Close Port Check Instrument Status Auto Check Status

Name	Set Value	Reflect Value
⊕ Ion Parameter (V)		
⊖ Ion		
Cooling Gas	0	0
Auxiliary Gas	0	0
Nebulizer Gas	0	0
RF Power	0	0
Peristaltic Pump Speed	0	
⊕ Torch Position (mm)		
⊖ Switch		
Angle Valve	Off	Off
Pneumatic Valve	Off	Off
Molecular Pump	Off	On
Mechanical Pump	Off	Off
Peristaltic Pump	Off	Off
Water Switch	Off	On
RF Switch	Off	Off
Atomizer Chamber	Off	Off

- To protect detector, increase Analog Detector's pressure to "-1000", decrease the pressure of counter to "500", which can be set by clicking up and down arrow to increase or decrease by "-500" and "200" separately.

ICP-MS Explorer - [仪器控制]

文件 视图 操作 工具 仪器 窗口 帮助

氩气压力: 0.07MPa 分析室压力: 4.27-7mbar 锥间压力:

关闭端口 查询 启动定时器

名称	设置值	反馈值
离子透镜参数 (V)		
抽取锥	-128	-141
透镜1	-1000	-1076
透镜2	-69	-85
透镜3	-200	-185
聚焦透镜1	11	14
聚焦透镜2	-41	-55
聚焦透镜3	-140	-34
偏转透镜	-25	-125
DtM	0	0
DtRes	0	0
六级杆	0	0
四级杆	0	0
六级杆幅度	1	0
计数探测器	500	500
模拟探测器	-1000	-1000
PL6	0	0
雾化室温度	0	170
OutA	0	0
OutB	0	0
OutC	0	0
OutD	0	0
等离子体参数		
炬管位置 (mm)		
阀门控制		

- Turn off instrument solid-state power and RF Power, loosen the hose on peristaltic pump, close water tank and argon reducing valve.

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