

Agilent 7700 ICP-MS 现场培训教材

安捷伦科技有限公司化学分析仪器部

一、 培训目的:

基本了解7700 ICP-MS 硬件操作。 掌握7700 ICP-MS的开机、关机、参数设定及数据采集,全定量分析的基本操作。

- 二、培训准备:
- 1、仪器设备: Agilent 7700 ICP-MS
 - Concentric Nebulizer(同心雾化器)。
- 2、气体准备:
 - •氩气压力 700KPa±3.5%
 - •反应气(氢气和氦气)压力 40KPa±20KPa
- 3、循环水:
 - •循环水的要求为: **蒸馏水**;温度: 15-20 °C;压力: 230-400Kpa(33—58PSI) •循环水中加入50ml IPA,防止生菌。
- 4、排风:

•要求排风量为: 5-7m³/min(4.7-6.6m/s)。



Agilent 7700 Series

7700 ICP-MS MassHunter 基本操作步骤:

一、开机:

- 1、开PC 显示器、打印机。
- 2、开PC 主机。(password: 3000hanover)
- 3、开ICP-MS 7700 电源开关。(仪器背后总电源及前面板左下角的电源开关)

4、双击桌面的"ICP-MS Top"图标 进入MassHunter,如下图所示:	
TCP-MS Top - GENERAL.QCC / DEFAULT.M	
Instrument AcquireData DataAnalysis Methods Sequence Chained Sequence Tools Offline Tools Run Information Help	
🔤 🖪 🔄 🧮 🕼 🚺 🕼 🎼 🕼 🕼 🕼 🕼	
Method DEFAULT.m - C:\ICPMH\1\METHODS\	Sequence

ICPMS工作站工具栏上提供了以下快捷方式

按钮	操作	按钮	操作
	显示仪器状态面板		显示数据采集面板
Д	显示调谐面板		显示数据分析面板
() r	运行当前方法	W r	运行当前序列
12	运行方法向导	1	编辑序列
0	编辑方法		调用序列
() C	调用方法		保存序列
() E	保存方法	?	显示联机帮助窗口

5、从Instument菜单中选择"Instrument control"或者单击"Instrument control"图标 3 进入下图 所示的仪器控制面板。从"Vacuum"菜单中选择"vacuum on",抽真空,仪器由shutdown状态向 standby 状态装换

TCP-WS Top - GENERAL.QCC / DEFAULT.W	_ 🗆 🗙
Instrument AcquireData DataAnalysis Methods Sequence Chained Sequence Tools Offline Tools Run Information Help	
Method DEFAULT.m - C:\ICPMH\1\METHODS\	Sequence
I OFFLINE Instrument Control - [SHUIDOWN (SIANDARD)]	
Plasma Vacuum Diagnostics Maintenance Meters Maintenance Log Help Vacuum ON Vacuum OFF	
Start pumping of vacuum	
	IDLE //

*** 从Meters菜单中选择Meter Control Panel,进入如下图所示的画面,可以对真空、水流量、环境温度、雾室温度、气体压力及射频功率进行实时监测。(最多同时可选5项) IF/BK Pressure---接口及背压阀压力; Analyzer Pressure---分析腔压力;

TMP Revolution 一分子涡轮泵转数;

Water RF/WC/IF -循环水流量; Water Temperature -循环水温度;

Inlet Temp 仪器环境温度; Internal Temp 仪器内部温度; S/C Temperature 雾室温度;

Forward Power 入射功率; Reflected Power 反射功率; Plasma Freq 等离子体频率

Carrier Gas Press 载气压力; Ar Gas Tank Press 氩气钢瓶压力;

Carrier Gas 载气流量; MU/Dil.Gas 补充气/稀释气流量; Aux Gas辅助气流量

Leters	
Vacuum	Gas
IF/BK Press TMP Revolution Analyzer Press	Carrier Gas Press OP Gas Tank Press Ar Gas Tank Press
Water Water RF/WC/IF	Carrier Gas MU./Dil. Gas Optional Gas Plasma Gas
Housing	I Aux Gas
Inlet Temp Internal Temp	Reaction Cell H2 Gas
Plasma RF	🔲 He Gas 🔲 Optional Gas
 Forward Power Reflected Power Plasma Freq. 	S/C
OK Ca	ncel Help

6、如使用碰撞反应池,从Maintenance菜单中选择Reaction Gas,勾选Open Bypass Valve,设置所需反应 气流量2-5ml/min,进行反应气气路吹扫。如果每天使用反应池吹扫5-10min即可;如长期不用使用前建 议提前2ml/min吹扫过夜



- 7、仪器状态转换为"STANDBY"状态后。开氩气(0.7Mpa),循环水、排风。清空废液桶,卡上蠕动泵管, 样品管必须放入DIW(去离子水)中,若连有内标管,亦放入DIW中。
- 8、从"Maintenance"菜单中选择"Sample Introduction...",进入下图:

Sample Introduction Maint	enace 🛛 🗙
Outputs	Inputs
🔲 Open Ar Gas Valve	Ar Gas Tank Press: 0.0 kPa
🗖 Open OP Gas Valve	OP Gas Tank Press: kPa
Gas Select	Carrier Gas Press: 0.0 kPa
Makeup C Dilution	OP Gas Press: kPa
Enable Temp Control	Plasma Gas: 0.0 L/min
(Upen water valve)	Aux Gas: 0.00 L/min
Plasma Gas: 0.00 L/mir	Carrier Gas: 0.00 L/min
Aux Gas: 0.000 L/mir	MU/Dil. Gas: 0.00 L/min
Carrier Gas: 0.000 L/mir	Optional Gas: 🕺
MU/Dil. Gas: 0.000 L/mir	S/C Temperature (L): 0.0 degC
Optional Gas: 🛛 🕺	
Temperature: 2 deg0	I orch Position
	Initialize
PeriPump	Maintenance
Nebulizer Pump: 0.00 rps	
Sample Pump: rps	Gas Controller
	Offset Adjustment
	Enter
Close	Help

并按照下图进行设置:

Sample Introduction I	laintei	nace 🛛 🗙
Outputs		Inputs
🔽 Open Ar Gas Valve		Ar Gas Tank Press: 0.0 kPa
C Open OP Gas Valve		OP Gas Tank Press: kPa
Gas Select		Carrier Gas Press: 0.0 kPa
Makeup Dilution	n	OP Gas Press: kPa
Enable Temp Control		Plasma Gas: 0.0 L/min
(Open water valve)		Aux Gas: 0.00 L/min
Plasma Gas: 15.00	L/min	Carrier Gas: 0.00 L/min
Aux Gas: 1.000	L/min	MU/Dil. Gas: 0.00 L/min
Carrier Gas: 1.000	L/min	Optional Gas: 🕺
MU/Dil. Gas: 1.000	L/min	S/C Temperature (L): 0.0 degC
Optional Gas:	%	
Temperature: 2	degC	Forch Position
· · · · · · · · · · · · · · · · · · ·		Initialize
		Maintenance
Nebulizer Pump: 0.10	rps	
Sample Pump:	rps	Gas Controller
		Offset Adjustment
		Enter
C	lose	Help

检查确认"Inputs"显示与"Outputs"输入一致,蠕动泵样品管及排废液管工作正常; 排液平滑,气体及液体排列均匀;几分钟后,点击"Close"退出Sample Introduction Maintenance界面。

9、从Instument control界面选择Plasma菜单中的Plasma ON或单击下图所示的点火图标 建行点火,仪器 由Standby 状态向Analysis状态转换。

**** 若停机在"Standby"模式,开机跳过2-5 步。

二、调谐:

1、点火后, 15-30分钟预热仪器, 点击"ICP-MS Top"画面的"Tune"图标 进入下图所示的调谐画面。

od DEFAULTAL - DAICPCHEMIN	METHODS - Ca	libration DEFAUL	T.C - D:W	CPCHEM(1)	CALIB\	Sequence DEFAULT.S - DAICPCHEMINSEQUENCE
ICP-MS Tuning Sensitivit	y AUTOTUNE.U tenance Log Help					
une File Autotune.u - D:UCPC		The shares		_		2
Plasma Parameters	顶店各杯 ~~	Range	Count	Mean	RSD[3:]	
RF Matching 1.72 [1.72]		1.014 44	6549	8749.1	2.09	
fap1 Depth 0.0 [7.0]	ma	in or a stat		and see a	100	
Torch-H =0.1 [=0.2]	Inche 89	12.0E4 -	10799	10872.8	2.28	
Toxah-V -0.2 [0+0]	aaa 205	1.0E4	5171	5060.6	2.38	
Carrier Gas 0.76 [0.76]	L/ain	120 21 21			a	
Bakeup Gas 0,26 [0.24]	L/min -	150				CALLARANCE.
Rebuilding home 0.10 [0.10]		20 -114				1. A.A. 200-A.S.
Town in Plant 0.00 10.001	100					and the second sec
5/C Temp 2 [2]	deat	20 121				
Ion Lenses		[20 =in]				
Extract 1 4.4 [3.4]	v	and and				
Extract 2 -100.0 [-100.0]	v	20				
Omega Bias-ce -14 [-14]	v	inter oci				
Omega Lens-ce 1.4 [1.0]	v	150 300			and the second s	
Cell Entrance -24 [-30]	Y	20 -				
0P Pocus 4 [4]	<u>.</u>	the second second				
Cell Exic -36 [-40]	3	120 1121			1.00	
ARU Gain 133 (1291		20 12			510	
ANU Offset 125 [128]		and the second s				Integration Time: 0.10 sec
Axis Gain 1,8002 [1,0002]		150				Sampling Period: 0.21 sec
Asts Offset 0.00 [D.00]		20 111			Help	and and a second s
QP Bias -5.0 [-3.0]	-V					n 32
Octpole Parameters	Contraction of the second s	20 12				E Auto Vert Barne
0ctP RF 180 [180]	W.					a source that get
0ctP Biaz -6.0 [-6.0]						
Reaction Cell						
Reaction Rods OFF [0FF]	1000000					
He Gas 0.0 10.01	allarin					
Opitimusl 0-se 0 101	5					and the second se
Detector Parameters						St Forward Do M St Deflected D
						Kenected P
Discriminator 0.0 [0.0]	av V .					

调谐界面工具栏有以下图标:

按钮	操作	按钮	操作
Ê	从文件调用调谐参数		将调谐参数保存至文件
	生成调谐报告	<u></u>	打印当前图形
	调谐灵敏度	M0⁺	调谐氧化离子
M++	调谐双电荷离子		调谐分辨率和质量轴
AUTO	进行自动调谐	Man	设置用于调谐的采集参数
34.9	选择仪器状态监测读数表	?	显示联机帮助窗口

2、将样品管放入 1 ppb 调谐液中。若连有内标管,将内标管亦放入DIW 中。点击"调谐灵敏度"图标 进入灵敏度调谐画面。从"Acq.Parameters"菜单中选择Acquisition parameters或单击Acq.Parameters采集参

数图标 输入采集的质量数7、89、205,156/140(CeO/Ce 氧化物),70/140(Ce2+/Ce 双电荷),并选 中"Plot",点击"OK"按钮。点击"Start"按钮开始采集,点击"Stop"按钮停止采集。确认灵敏度、氧化物、双电 荷是否达到要求。否则重新自动调谐。

	Mass o	or Ratio		Displayed Tune Parameters
Channel1	7	1	Plot	🗄 🗹 Plasma Parameters
Channel2	89	1	Plot	E Ion Lenses
Channel3	205	1	Plot	U-Pole Parameters Detector Parameters
Channel4	70	/ 140	Plot	
Channel5	156	/ 140	Plot	
Channel6		1	🗖 Plot	
Channel7		1	F Plot	
Channel8		1	🗖 🗖 Plot	
Channel9		1	F Plot	
Channel10		1	F Plot	
Channel11	-	1	F Plot	
Channel12		1	🗖 Plot	
Channel13		1	Flot	
Channel14		1	Flot	
Channel15		1	Flot	
Integratio	n Time:	0.10	sec	

Test Item		Spec.
Mass Axis 质量轴	Li (7)	±0.1amu
	Y (89)	±0.1amu
	11 (205)	±0.1amu
Mass Resolution分辨率(at 1	0%)	0.65-0.85amu
Sensitivity灵敏度(0.1sec,1ppb)		Li≥3000
		Y≥12000
		Tl≥6000
Oxide氧化物(CeO/Ce)		≤1.2%
Doubly Charged双电荷(Ce2	2+/Ce)	≤2.0%

3、单击"分辨率/质量轴调谐"图标 , 进入分辨率/质量轴调谐画面。点击"Start" 按钮启动采集。点击"Stop"按钮停止采集。确认分辨率/质量轴是否达到表一的要求。否则重新自动调谐。

ILEP-MS Tuning - Resolution/Axis 0309.0			
10309.0 - CUCPCHEM(1/7500)	A MARINA AND A MARINA A	2	
m/s 7 89 200 Height 9181 5138 10522 Aare 55 89 00 20550 4000 0.60 0.65 0.55 w1020 0.70 0.70 0.70	AAAA	Trapani Shop	And Annual Through
OF Base 100 V Create The Base 300 n, 300 (V) Althouse 300 n, 300 (V) AMU Other 100 AMU Other	Hergestion Tene 0.10 on Acquisition Tene 22.76 onc	' Log	
 C.2.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		NUSV	

***** 一般左边缺省的显示参数对大多数用户足够。如要添加,点击"Acq. Parameters"菜单, 在Displayed tune

parameters中进行选择。

4、自动调谐

FFLINE Tuning - Sensitivity NC	GAS. U								
Tune Acq. Params Meters Maintenance	Log Help								
Sensitivity Oxide Ion Doubly Charged Ion]		?						
Resolution/Axis									-
P1 P/A Factor Generate P/A Factor Report		m/z	Range	Count	Mean	RSD[%]			
Reaction Gas			20 11						
Full Spectrum		205							
Autotune	in	205							
Peri Pump Program for Autotune RF Matching	ln.	156/140 70/140	20						
Nebulizer Pump 0.10 [0.10] rps			20 11						
Sample Pump 0.00 [0.00] rps	-								
- S/C lemp Z [2] deg	6	Serie .	20			10000			
Fytract 1 0.0 [0.01 V			20 21						
Extract 2 -160.0 [-160.0] V									
Omega Bias -80 [-80] V			20						
Omega Lens 8.0 [8.0] V									
Cell Entrance -30 [-30] V			20						
Cell Exit -50 [-50] V			20						
Deflect 15.0 [15.0] V		_	in a set of			Star			
Plate Bias -40 [-40] V			20					Integration Time: 0.10	
-Pole Parameters			20			Stop		integration time. 0.10	360
AMU Gain 135 [135]						Heln	1	Sampling Period: 0.62	sec
AMU Uffset 127 [127]		1.000	20						
- Axis Gain 1.0003 [1.0003]			20						
OP Bieg			20 =					🔲 Auto Vert. Range	
crole Parameters									
OctP Bias -8.0 [-8.0] V									
eaction Cell									
Reaction Mode OFF [OFF]									
-H2 Gas 0.0 [0.0] mL/	min								
He Gas 0.0 [0.0] mL/	min								
Optional Gas 0 [0] %									
etector Parameters									
Discriminator 4.5 [4.5] mV									
Analog HV 1787 [1787] V									

选中如下图所示Tuning Items的下除P/A Factor的所有选项,点击Run

Autotune	×
Tuning Items ✓ EM ✓ Discriminator ✓ Resolution / Axis ✓ Torch H/V ✓ Lens ✓ Tuning Report	
Autotune Details	
P/A Factor P/A Factor Configure	
Reset to Default	
Run OK Cancel Help	

自动调谐会生成nogas.u 和He.u, 两个调谐文件,调用nogas.u调谐检查灵敏度,氧化物及双电荷调用He.u调谐检查He模式灵敏度Co≥3000,背景56≤18000CPS

调谐参数:

1. 等离子体参数的调谐

采用同心雾化器(Concentric Neb 或MiroMIST Neb)的系统典型参数如下:

等离子功率	1500W
载气流量	0.9L/min(0.6~1.0L/min)
补偿气流量	0.25L/min(0.3~1.0L/min)
进样深度	8mm(7~10mm)
蠕动泵速	0.1rps(0.1~0.2rps)
预混室温度	2 摄氏度

注:7700有三种调谐模式: No gas模式, He 模式(标配), H₂ 模式(选配),

其中No gas模式不通反应气

H2模式用于压制因等离子体焰产生的干扰,如ArO,Ar2,ArH

- He 模式用于压制因样品基体产生的干扰,如NaAr,ClO,ArCl 等等
- 2. 离子透镜的调谐



2.1 典型的离子透镜电压如下:单位伏特

	No gas模式	反应气模式(H2 或He)
Extract 1	0 (0)	同左
Extract 2	-180 (-200~-160)	同左
Omega Bias	-80 (-110~-70)	同左
Omega Lens	10 (7~12)	同左
Cell Entrance	-30 (-40~-30)	-40 (-40~-30)
Cell Exit	-50 (-60~-40)	-60 (-60~-40)
Deflect	10 (8~15)	0 (-5~4)
Plate Bias	-40 (-50~-30)	-60(固定)
Octopole RF	190 (100~200)	同左
Octopole Bias	-8 (-12~-6)	-18(固定)
QP Bias	-5 (-5~-3)	-15(固定)
Не	0	4.5 (4~5)
H ₂	0	6 (5~7)

注: QP Bias 比Octopole Bias 电压高2~4 ev

三、P/A Factor 调谐:

将样品管插入 PA factor 调谐溶液 (Sc(45), In(115), Tb(159), Bi (209) 20-30ppb内标稀释液)。 在灵敏度调谐窗口观察 Sc(45), In(115), Tb(159), Bi (209) 元素灵敏度,待稳定后,确保元素灵敏度在 **40,000-400,000 Counts** 之间,再点击"**Tune**"菜单,选择"**P/A Factor**"。

在下图所示的"**P/A Factor Tuning**"窗口添加Li(6)、Sc(45)、Y(89)、In(115)、Tb(159)、Bi(209)元素。

terified [YSHLIUT.m - d;\YSHLIU\ Callesteen [YSHLIUT.C - C;\UCPCHEM\1\CALIB\	Sequence DEFAULT.S - C:(ICPCHEM(1)SEQUENCE)	
	KIL	
District II District II District II District II District II District II District III District III District IIII District IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Integration, Tome 0.10 are: Semping Pariot. 0.51 sec 7 1 Auto Vent Flange	
ariesta) in C.VCPCHEMVCPIDE Vanture man loadest	8057	

点击"Run"按钮, 仪器将自动得到P/A Factor Tuning 报告。

**** 若调谐时修改了"Detector Parameters",一定要做P/A Factor 调谐。

**** 做P/A Factor 调谐,要选中"Merge in the current data"

********建议选择单He模式,该模式可以采用同一工作条件消除环境、食品、矿物等复杂基体样品中目标元素的 各种干扰,无需切换气体、无需改变条件。分析速度更快,信号更稳定,仪器故障率更低。

四: 试剂准备及方法建立

试剂准备:

校准标液及 PA Factor 调谐溶液:

•Agilent Calibration Verification Standard (Part # 5183-4682) 或Environmental Calibration Standard (Part # 5183-4688, 1000ppm Fe, K, Ca, Na, Mg 及10ppm Ag, As, Se, Cd, Pb, Ni, Cu, Zn 等。)

- HNO3 。

- DI 水。

- Agilent Tuning 溶液: 1ppb Li, Co, Y, Ce, TI 。

•PA Factor 溶液: 将Part# 5183-4680, 10ug/mL Li6, Sc, Ge, Y, In, Tb, Bi) 稀释200倍, 得到PA factor Tune 溶液(50ppb Li6, Sc, Ge, Y, In, Tb, Bi)。或稀释10倍,内标管进样相当于50ppb

标液:

 用1%HNO3 稀释 Calibration Verification Standard (Part # 5183-4682) 或Environmental Calibration Standard (Part # 5183-4688, 1000ppm Fe, K, Ca, Na, Mg 和10ppm Ag, As, Se, Cd, Pb, Ni, Cu, Zn 等) 到 1000 和 500 倍,得到STD1 和 STD2 。

• 准备 1ug/L 和2 ug/L Hg 在 1% HNO3 中,作为 STD3 和STD4 。

• 空白 1% HNO3 为STD0。

• 准备1ug/mL 内标(ISTD) 溶液。-----稀释(Part# 5183-4680, 10ug/mL Li6, Sc, Ge, Y, In, Tb, Bi)得

到。

• 准备 tapwater 于1% HNO3 中。

1、在"ICP-MS Top"画面,从"Methods"菜单中选择"Edit entire method"



2、进入"Edit Method"窗口。



3、如上图所示,选中所有选项,点击"OK"按钮,进入如下画面。

Tethod Information
Method Comments:
This is the default method
Save Copy of Method With Data
Export AIA format for Agilent LC/GC
Export Agilent LC/MSD raw data
📃 Export Spectrum to TSV File
CPS Data CPS Data
Method Sections To Run:
Pre-Run Cmd/Macro:
Pre-Run Monitor Configure
Post-Run Cmd/Macro:
OK Cancel Help

4、在"Method Comments" 中输入方法注解。如"This is the EPA2008 method "。点击"OK"按钮,进入以下画面。

Select Sample	lypes		
Sample Types:		Selected Sample Types:	
	Add-> <-Remove	Bkgnd BlkVrfy CalBlk CalStd DillS DilStd DriftChk FQBlk IsoStd QC1 QC2 QC3	
[ОК	Cancel	Help

5、在"Select Sample Type" 画面,选中全部样品类型,点击"OK"按钮。

6、在"Interference Equation"窗口,如使用No gas模式选中EPA200_8,如使用单氦气模式选中FOODORS,如下图所示,干扰方程列于窗口中。点击"OK"按钮



7、在"Acquisition Mode"画面,选中"Spectrum"选项,点击"OK"按钮。



8、在"Peak Pattern "窗口,选中"Full Quant (3)",然后点击"Periodic Table "进入下一画面。

Spectrum Acquisition Paramete	rs 🛛 🔀
Masses	Set every Mass Integration time per Point: 0.10 [sec] (100.00 [msec])
120 140 160 180 200	per Mass: 0.30 [sec]
220 240 260 Periodic Table Mass Scale	Acquisition Time
TRA (1) Full Quant (3) Semi Quant (6) Maximum (20)	Acquisition: 0.000000 [sec] Repetition: 3 Total Time: 0.0000 [sec]
OK Cancel Help Check	k Parameter Enter

9、点击"Clear All" 按钮,再选中要分析的元素及ISTD 内标元素,如:Na, Mg, K, Ca, Fe, V,Cr, As, Cu, Ni, Zn, Hg, Pb, Cd 等及ISTD内标元素Sc, Ge, Y,In,Tb, Bi 。

Las	ses																×
н			Number of Masses: 29										He				
Li	Be												Ne				
Na	Mg				Show	Interfe	erence	Equal	tion			AI	Si	Р	S	CI	Ar
к 1	Ca 1	Sc 1	Ti	V	Cr 1	Mn 1	Fe 2	Co 1	Ni 1	Cu 1	Zn 1	Ga	Ge	As 1	Se 1	Br	Кг
Rb	Sr	Y 1	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag 1	C d 1	In 1	Sn	Sb	Te	-	Xe
Cs	Ba	L	Hf	Ta	¥	Re	Os	lr	Pt	Au	Hg 1	TI 1	РЬ 1	Bi 1	Po	At	Rn
Fr	Ra	Α															
		L	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Т ь 1	Dy	Ho	Er	Tm	Yb	Lu
		Α	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
⊛ F ⊜ N	Periodic Table Clear All Mass Table OK Cancel Help																

10、点击"OK"按钮,进入下一画面。



11、选中"Set every Mass",在 "Repetition" 窗口输入"3"。然后在右侧"Integration Time [sec]" 窗口 中选定As,输入Intergration time为1sec,点击Enter,Se,Cd,Hg---2 sec;其他元素设定为 0.3 sec;



12 、点击" Check Parameter" 按钮,若"No Error",点击"OK"按钮,(若有error,则检查参数)进入"Peristaltic Pump Program"画面。

Peristaltic Pump Program		×
Before Acquisition ——		
Uptake Speed:	0.30	rps
Uptake Time:	30	sec
Stabilization Time:	45	sec
OK Cano	el	Help

13、在"**Peristaltic Pump Program"** 窗口,设定uptake speed: 0.3rps; uptake time 30 sec,; stabilization time 30sec 。点击"**OK"** 按钮,进入下一画面。



14、点击"OK"按钮,进入下一画面。

Save Method As	
C:\ICPMH\1\METHODS\	<u> </u>
File Name: EPA2008.m	
	OK Cancel Help

15、输入方法名,如"EPA2008",点击"OK"按钮,采集方法编辑完成。

五:采集数据:

- 1、将内标 ISTD 管放入1 ppm ISTD 溶液中,样品管放入1% HNO3 溶液中。在"Tuning" 窗口检查 ISTD 元素(Ge, In, Tb,Bi etc) RSD% 应小于5% 。
- 2、在"ICP-MS Top" 画面,点击"AcquireData" 菜单,,选中"Main Panel",或点击采集数据图标 进入如下画面。

SOFFLINE Acquisition - DEFAULT. M / ICPDEMO.D	
AcquireData EditParameters Logs Help	
Acquire Data	
Exit	

3、点击"Aquire Data" 菜单,选中"Aquire Data" 选项,或点击 进入如下画面。

Acquire Data	×
	DNOPCHEM/11DATA/
Data File Name :	TEST.d
Disk Space :	899 MB free on drive D
Operator Name :	
Sample Name :	
Mise. Info:	
Dilution	1.000 Esiculate
ISTD Conc:	Level 1 Change
	Acquire DK Cancel Help

4、将样品管放入空白,如 1% HNO3 或DIW,输入文件名,blank.d,默认路径为 C:\ICPMH\1\DATA\(如需更改路径,在Data File Name处输入"?"指定路径), Operator Name (User), Dilution Factor (1.00),样品名 (如 1% HNO3 或DIW)。点击"Acquire",进入下一画面。

spineData EditParamete 🚰 🧭 😤	а»: РыйРили	n tinp: H	հակո			
2 0F5 •••						Bestell Burr Ship Burr
	20	40	<u>ה</u> ח	00	100	i abulate / Mass
	1					Data Analysis Status
0 1111 100 2 0F5 **	120	140	160	180 CPS	200	Acq has tinished
n	22n	240	200	11		

- 5、当采集完成后,可点击"Tabulate/Mass",检查所测数据的稳定性。
- 6、重复3----5 采集完其它STD和样品



1、点击"DataAnalysis"菜单,选择"Main Panel..."或点击数据分析图标 📟 进入数据分析窗口

E	0 1	line ICP-WS Data Analysis								
1	Fil	e Edit View Process DA Method Report Tools Global Help	_							
ł	ß	New Batch Folder Ctrl+N		,		Conc	🛄 Count		2	4
В	D	Open Analysis File Ctrl+O								×
1		Save Analysis File Ctrl+S			-	FQC)utlier: 🍀	<u>۲</u>	61	22
		Save Analysis File As								
		Close								
		Import All Samples From Batch								
		Import Samples								
		Export								
	I <u>₿</u>	Page Setup								
	\$	Print Ctrl+P								
	۵,	Print Preview								
		1: I:\22\MassHunter\MH\DemoData\DEMO_FQ.b\DEMO_FQ.batch.xml								
		2: I:\\MassHunter\MH\DemoData\DEMO_TRA.b\DEMO_TRA.batch.xml								
19		3: C:\ICPMH\1\DATA\DEMO.b\DEMO.batch.xml								×
1		4: C:\ICPMH\1\DATA\DEMO_FQ.b\DEMO_FQ.batch.xml	rocess	Batch	0	Curve	Fit:		• Ori	gin:
1		5: C:\ICPMH\1\DATA\1.b\1.batch.xml	888 //II							
Γ		Exit							E	
	1	20-								
	1									
		90							E	
									L	
0	nlin	e								.::

在file菜单下选择New Batch Folder,输入文件夹名,点击"Create"创建批处理文件夹

New Batch F	older							? 🗙
Save In:	🚞 DATA			*	G	3 🖻	•	
我最近的文档 反 東面 My document 表的电脑	☐ 1. b ☐ DEMO. b ☐ DEMO_FQ. b ☐ DemoData							
网上邻居	Folder Name:	test				~		Create
	Save As Type:	Batch Folder	(*. b)			~		Cancel
								帮助(H)

2、选择"DA Method"菜单下的"Edit"

📴 Online ICP-IS Data Analysis - test.b - test		
File Edit View Process DA Method Report Tools Global Help		
: 📂 🗁 🔚 😓 🖻 📝 Edit - F9 - 📜 📜 🔣 🔢 💷 🖂 🦉 🗒 Conc 💷 Count 🏢 [2 2 (a ;
Batch Table : FullQuant		×
Sample: 🛖 👆 Sample Type: 🕼 👻 Analyte: 🖕 💌 🔶 ISTD: 🦉 📜 FQ Outlier: 🏹 🌪	717	٣
FullQuant		

进入分析方法编辑窗口

🔄 Online ICP-MS Data Analysis - (Method	Editor) - test	
File Edit View Process DA Method Report Tools G	lobal Help	
i 🖻 📄 🔒 🐚 👘 📳	∎ 2 🖩 🖻 🖉 🍟 !	🔲 Conc 🏢 Count 🊺 🚺
Method Development Tasks ×	Method Table: Data Analysis Me	ethod 🗙
1. New	DA Method Task: 잠 🛃	
Reset DA Method	Data	Next Basic Method Task
Import DA Method Only	FullQuant Analysis	<u> </u>
Import DA Method and Standard Data	QC Check on FullQuant	
Import FQ Parameters from CS Cal	SemiQuant Analysis	
2. Set up Basic Information	Isotope Ratio Analysis	
Data Analysis Method	Isotope Dilution Analysis	
3. Set up Analyte		
Analyte List	Analysis Mode	Spectrum
4. Set up Analysis Parameters	Bkg Subtraction if Exists	Count Subtraction except for ISTD
FullQuant	Interference Correction	Ass Defined
SemiQuant		Acq. Deimed
Isotope Ratio		
* Advanced Info		
FullQuant Outlier		
QC Parameters		
Worklist Actions		
5. ¥alidate/Return		
Validate		
Return to Batch-at-a-Glance		
Online	II	0 Analytes - 0 ISTD .::

如上图所示,选中"FullQuant Analysis", 后点击 图标

📱 Online ICP-IS Data Analysis - (Iethod	Editor) - test
File Edit View Process DA Method Report Tools G	lobal Help
🖻 🗁 🔒 🐁 📭 👘 📳	🔀 🛃 🛄 🖂 🖉 🍟 💷 Conc 🏢 Count 🚺 🗱
Method Development Tasks X	Method Table: Analyte List 🗙 🗙
1. New	DA Method Task: 💣 😺 🛜 🔯 💥
Reset DA Method	Analyte
Import DA Method Only	Tune Step 🗠 Mass 🗠 Name 🗠 Analyte/ISTD
Import DA Method and Standard Data	
Import FQ Parameters from CS Cal	
2. Set up Basic Information	
Data Analysis Method	
3. Set up Analyte	
Analyte List	
4. Set up Analysis Parameters	
FullQuant	
SemiQuant	
Isotope Ratio	
* Advanced Info	
FullQuant Outlier	
QC Parameters	
Worklist Actions	
5. Validate/Return	
Validate	
Return to Batch-at-a-Glance	
Online	0 Analytes - 0 ISTD .::

进入分析物列表,点击 图标,从采集方法中调用元素列表,也可点击 图标从已采集数据中调用元素列表。成功调用元素列表后,选择ISTD内标元素

🔄 Online ICP-IS Data Analysis - (Iethod	Edito	r) - test				
; File Edit View Process DA Method Report Tools G	lobal H	elp				
🗄 📂 🕞 🚼 🗞 📭 🗭 DA Method Editor 💡	i 🖪 🛙	8 8 🖩 🖂 🛛	Z	"; 💷 🛛	onc 🎹 Count	
Method Development Tasks	Metho	d Table: Analyte L	ist			×
1. New	DA E	Method Task: 🔥	(建) 🔓	2 🕅 🕈	• 🗙 👘	
Reset DA Method			Anal	yte		
Import DA Method Only		Tune Step 🗠	-Mass 🛆	Name	Analyte/ISTD	
Import DA Method and Standard Data	1	1	23	Na	Analyte	
Import FQ Parameters from CS Cal	2	1	24	Mg	Analyte	
2. Set up Basic Information	3	1	27	AI	Analyte	
Data Analysis Method	4	1	39	к	Analyte	_
3. Set up Analyte	5	1	43	Ca	Analyte	
Analyte List	6	1	45	Sc	ISTD 🔫	-
4. Set up Analysis Parameters	7	1	51	V	Analyte ISTD	
FullQuant	8	1	53	Cr	Analyte	-
SemiQuant	9	1	55	Mn	Analyte	-
Isotope Ratio	10	1	56	Fe	Analyte	-
* Advanced Info	11	1	57	Fe	Analyte	-
FullQuant Outlier	12	1	59	Co	Analyte	-
QC Parameters	13	1	60	Ni	Analyte	-
Worklist Actions	14	1	63	Cu	Analyte	-
5. Validate/Return	15	1	66	Zn	Analyte	-
Validate	16	1	72	Ge	ISTD	-
Betweeto Batch, at. a.Glance	17	1	75	As	Analyte	-
	18	1	82	Se	Analyte	-
	19	1	89	Y	ISTD	-
	20	1	107	Ag	Analyte	-
	21	1	111	Cd	Analyte	N
Online					24 Analytes - 519	STD .:

4、点击 图标,进入设置分析参数画面,如下图分别设置Curve Fit曲线类型,Origin原点选项,虚拟内标,浓度单位,及标样浓度

Doffline ICP-IS Data Analysis - (Iethod Editor) - IRY File Edit View Process DA Method Report Tools Global Help

📂 📂 📙 🗞 📭 🎽 DA Method Editor 🔗 Process Batch 🕜 😨 🔢 🛃 🛄 🖂 🗹 Default Leyout 🗄 💷 Conc 🛄 Count 🔯 🛐 ன 🐼 Default Column

Method Development Tasks	Methor	Table: FullQu	ent en c	-							_					
1. New	DA	Method Task:	 •	t - et												
Reset DA Method					Basic Ca	alibratior	n Paramete	rs								
Import DA Method Only	Cal	ibration Title	Calibrati	on Meth	od Edit ISTI) Conc	Weighting	Virtual IS	TD Correcti	on VIS Int	terpolatio	n Fit				
Import DA Method and Standard Data	•		External Ca	libratior	1 🗖				•	Pointt	to Point					
Import FQ Parameters from CS Cal																
2. Set up Basic Information					Ar	nalyte						Le	vel		QC	Blank
Data Analysis Method		Tune Step / Mass / Name Curve Fit Origin ISTD Min Conc Units Level 1 Level 2 Level 3 Level 4 QC1 BlkVr								BlkVrfy						
3. Set up Analyte	1 →		1 23	Na	Linear	Ignore	•	VIS	0	ppb	0	500	1000	2000		
Analyte List	2		1 27	Al	Linear	Ignore		VIS	0	ppb	0	5	10	20		
4. Set up Analysis Parameters	3		1 39	к	Linear	Ignore	,	VIS	0	ppb	0	500	1000	2000		
FullQuant	4		1 43	Ca	Linear	Ignore	,	VIS	0	ppb	0	500	1000	2000		
SemiQuant	5		1 51	V	Linear	Ignore	• •	VIS	0	ppb	0	5	10	20		
Isotope Ratio	6		1 55	Mn	Linear	Ignore	•	VIS	0	ppb	0	5	10	20		
* Advanced Info	7		1 56	Fe	Linear	Ignore	•	VIS	0	ppb	0	500	1000	2000		
FullQuant Outlier	8		1 57	Fe	Linear	Ignore	,	VIS	0	ppb	0	500	1000	2000		
QC Parameters	9		1 59	Co	Linear	Ignore	,	VIS	0	ppb	0	5	10	20		
Worklist Actions	10		1 60	Ni	Linear	Ignore	,	VIS	0	ppb	0	5	10	20		
5. Validate/Return	11		1 63	Cu	Linear	Ignore	,	VIS	0	ppb	0	5	10	20		
Validate	12		1 66	Zn	Linear	Ignore	•	VIS	0	ppb	0	5	10	20		
Return to Batch-at-a-Glance	13		1 95	Mo	Linear	Ignore	•	VIS	0	ppb	0	5	10	20		
	14		1 208	РЬ	Linear	Ignore		VIS	0	ppb	0	5	10	20		

	ISTD											
	Tune Step 🗠	Mass 🗠	Name	VIS Flag	Units							
	1	6	Li									
	1	45	Sc									
	1	72	Ge									
	1	89	Y									
	1	115	In									
	1	159	ТЬ									
•	1	209	Bi									

5、设置完成后点击左侧菜单中的FullQuant Outlier ,如下图设置预警参数

📱 Online ICP-MS Data Analysis - (Method Editor) - IRY File Edit View Process DA Method Report Tools Global Help 📂 🗁 🔚 😓 🖬 🗭 DA Method Editor 🛛 🕏 Process Batch 💿 🤅 📅 🔢 📰 🖂 🗹 Default Layout 🕴 🎹 Conc 🏢 Count | 🋐 🚺 🌆 Default Columns X Method Table: FullQuant Outlier Setup Method Development Tasks 1. New DA Method Task: 👔 😺 Reset DA Method Global Setting Method Outlier Ҟ Enabled Minimum Value Maximum Value Reference Import DA Method Only... • 0.95 Import DA Method and Standard Data... Calibration Curve Fit R Import FQ Parameters from CS Cal... 7 ISTD Recovery % [compared with CalBIk] 80 120 2. Set up Basic Information QC Sample Conc Stability % [use 'QC1' Sample] \mathbf{V} QC1 Data Analysis Method QC Sample Conc Stability % [use 'QC2' Sample] QC2 QC Sample Conc Stability % [use 'QC3' Sample] Γ QC3 3. Set up Analyte Count RSD% 7 5 >= 10000 cps Analyte List • Blank Conc Level % [use 'BlkVrfy' Sample] 100 BlkVrfv 4. Set up Analysis Parameters • Out of Calibration Curve Concentration Range FullQuant Isotope Ratio * Advanced Info FullQuant Outlie QC Parameter

Worklist Actions

6、点击左侧菜单中的Validate,弹出未发现错误,验证通过窗口,点击OK

Sioniine ICP-ES Data Analysis - (Leth	and Auritor)	- 1KI				
File Edit View Process DA Method Report Tool:	s Giobal Help		-			
📴 📁 🔚 🌺 🔄 🖉 DA Method Editor 😴	Process Batch	🕜 : 📴 😼 🛃 🔛 🗠 🖉 Default Layout ;	Conc 🛄 Co	ount III III II	📕 🏭 Default C	olumns
Method Development Tasks	× M	ethod Table: FullQuant Outlier Setup				
1. New		DA Method Task: 💣 😺				
Reset DA Method			Global Setting		Method	
Import DA Method Only		Outlier	👯 Enabled	Minimum Value	Maximum Value	Reference
Import DA Method and Standard Data		Calibration Curve Fit R	v	0.95		
Import FQ Parameters from CS Cal		ISTD Recovery % [compared with CalBlk]	V	80	120	
2. Set up Basic Information		QC Sample Conc Stability % [use 'QC1' Sample]	v			QC1
Data Analysis Method		QC Sample Conc Stability % [use 'QC2' Sample]				QC2
3. Set up Analyte		QC Sample Conc Stability % [use 'QC3' Sample]	Г			QC3
Analyte List)	Count RSD%	v	с	5	>= 10000 cps
4. Set up Analysis Parameters		Blank Conc Level % [use 'BlkVrfy' Sample]	v		100	BlkVrfy
FullQuant		Out of Calibration Curve Concentration Range	V			
SemiQuant						
Isotope Ratio						
* Advanced Info						
FullQuant Outlier						
QC Parameters		_				
Worklist Actions			?-∎S Data An	alysis		
5. Validate/Return		6	Method va	lidated. No erro	rs or warnings f	ound.
Validate			~			
Return to Batch-at-a-Glance				确定		

7、点击左侧 Return to Batch-at-a –Glance菜单,弹出菜单询问是否更新分析方法,点击Yes 退出分析方法 编辑菜单

lethod Development Tasks	× M	ethod Table: FullQuant Outlier Setup				
1. New		DA Method Task: 👩 😺				
Reset DA Method			Global Setting		Method	
Import DA Method Only		Outlier	👯 Enabled	Minimum Value	Maximum Value	Referenc
Import DA Method and Standard Data		Calibration Curve Fit R	1	0.95		
Import FQ Parameters from CS Cal		ISTD Recovery % [compared with CalBlk]	V	80	120	
2. Set up Basic Information		QC Sample Conc Stability % [use 'QC1' Sample]	2			QC1
Data Analysis Method		QC Sample Conc Stability % [use 'QC2' Sample]				QC2
3. Set up Analyte		QC Sample Conc Stability % [use 'QC3' Sample]				QC3
Analyte List	•	Count RSD%	2		5	>= 10000 cp
4. Set up Analysis Parameters		Blank Conc Level % [use 'BlkVrfy' Sample]	2		100	BlkVrfy
FullQuant		Out of Calibration Curve Concentration Range	V			
SemiQuant						
Isotope Ratio						
* Advanced Info						
FullQuant Outlier		ICP-IS Data Ana.	lysis			
QC Parameters		(?) Update Date	. Analysis Metho	od?		
Worklist Actions		~				
5. ¥alidate/Return		し その 否	(N) 取消	1		

8、从File菜单中选择Import Sample...或Import All Sample From Batch调出样品数据

Ę	0 Or	line ICP-WS Data Analysis - IRY.b - IRY								
ł.	Fil	e Edit View Process DA Method Report Tools Global Help								
1	6	New Batch Folder Ctrl+N		🛄 Conc 🏢 Count 🏢						
B	D	Open Analysis File Ctrl+O			×					
1	8	Save Analysis File Ctrl+S	ISTD:	📮 FQ Outlier: 🏹 🦷	F					
ſ.		Save Analysis File As								
Γ		Close			23 Na [1					
L		Import All Samples From Batch	Type Level	Sample Name	Conc. [ppb] Cor					
		Import Samples								
		Export +								
	1	Page Setup								
	٩	Print Ctrl+P								
	4	Print Preview								
		1: C:\ICPMH\1\DATA\TRY.b\TRY.batch.xml								
1		2: C:\ICPMH\1\DATA\test.b\test.batch.xml			>					
S		3: C:\ICPMH\1\DATA\123.b\123.batch.xml	2 pages)		×					
ł		4: C:\ICPMH\1\DATA\1.b\1.batch.xml	🕏 Process Batch	Curve Fit: Linear	🔻 Origin: 🚆					
1111		5: C:\ICPMH\1\DATA\DemoData\DEMO_TRA.b\DEMO_TRA.batch.xml	yout: 🗱 📶 🕑							
T		Exit	27 AI [1] No a_	39K[1] <u>Noav_</u> 4	3 Ca [1] No_					
		×10 ' 50 '								
Ľ		51 V [1] Noay_	53 Cr [1] No a_	55 Mn [1] No_ 5	6 Fe [1] Noa_					
		×10 ¹ 150								
		57 Fe [1] Noa_	59 Co [1] No_	60 Ni [1] No a_ 6	3 Cu [1] No_					
Ľ										
		×101' 250 '								
C	nline	3	23 Na [1]	0 Samples (1 total)	.::					

9、选中标样和样品数据,点击"Open"按钮。



10、所选样品数据出现在列表中,更改Type样品类型。

📴 On	🗏 Online ICP-IS Data Analysis - IRY.b - IRY											
; File	Edi	t View	Process DA Method Report To	ools Global Help								
: 📂	🔁 🗁 🔚 🗞 📭 📝 DA Method Editor 🛛 🍟 🔜 🖬 🖬 🗠 🗹 🍟 🏭 Conc 🎟 Count 🚺 🇱 🇱 🎆											
Batch	atch Table : FullQuant X											
. Sam	Sample: 🛖 🐥 🛛 Sample Type: 🕼 🗸 🗸 🖌 Analyte: 🥠 23 👻 🎝 ISTD: 🔤 👘 👸 FQ Outlier: 🎇 🌪 🌾 🌾 🌾											
FullQu	iant											
				Sample				27 AI	[1			
	P	Rjet	Data File	Acq. Date-Time 🗠	Туре	Level	Sample Name	Conc. [ppb]	Co			
1 →			BLANK_090617.D	2009-6-17 11:58:00	Sampl 🔻		5%HNO3					
2			STD1_090617.D	2009-6-17 12:02:00	Sample		БррЬ					
3			STD2_090617.D	2009-6-17 12:05:00	Sample		10ppb					
4			STD3_090617.D	2009-6-17 12:10:00	Sample		10nwppb					
5			STD4_090617.D	2009-6-17 12:14:00	Sample		H2O					
<									>			

11、设置CalBlk, CalStd及Level。

📴 0n	line	ICP-	MS Data Analysis - TRY.	b – TRY					×
🕴 File	Edit	t View	Process DA Method Report To	ools Global Help					
i 🖻 (> 6	😓	📔 📑 📝 DA Method Editor	Çi 🖪 🖪		•• =	🛄 Conc 🛄 Count 🛛 🚺	2 3 4	
Batch	l able	: FullQ	uant						×
] Samj	ple: •	∱	• Sample Type: <all> - An</all>	alyte: 🔶 23 🔻 🖒	ISTD:		🚆 FQ Outlier: 🏹 🌪	· 6 6 6	; ;
FullQu	ant								
				Sample				27 A	[1
	۴	Rjet	Data File	— Acq. Date-Time — 4	Туре	Level	Sample Name	Conc. [ppb]	Co
1			BLANK_090617.D	Data File Name _{8:00}	CalBlk	1	5%HNO3		
2			STD1_090617.D	2009-6-17 12:02:00	CalStd	2	5ррb		
з 🕨			STD2_090617.D	2009-6-17 12:05:00	CalStd	4	20ppb		
4			STD3_090617.D	2009-6-17 12:10:00	CalStd	3	10ppb		
5			STD4_090617.D	2009-6-17 12:14:00	Sample		H20		

12、点击Process Batch,进行数据处理

🔄 () n	line	ICP-	MS Data Analysis - TRY.	b – TRY							
File	e Edit View Process DA Method Report Tools Global Help										
📂 I	D 1	🍃	🛛 🐚 🛛 🍞 DA Method Editor 📔	🗳 Process Batch	0 i 🖪 🖪		📕 🛃 🗾 Default Layout				
3atch	Table	: FullQ	uant								
Sam	Sample: 🛖 👆 Sample Type: 🕼 👻 Analyte: Process Batch 1] 🔹 🖶 ISID:										
FullQu	iant										
				Sample							
	٣	Rjet	Data File	Acq. Date-Time 🗠	Туре	Level	Sample Name	I			
1			BLANK_090617.D	2009-6-17 11:58:00	CalBlk	1	5%HNO3	ſ			
2			STD1_090617.D	2009-6-17 12:02:00	CalStd	2	5ppb	I			
з 🕨			STD2_090617.D	2009-6-17 12:05:00	CalStd	4	20ppb	I			
4			STD3_090617.D	2009-6-17 12:10:00	CalStd	3	10ppb				
5			STD4_090617.D	2009-6-17 12:14:00	Sample		H20	I			

13、列表中显示标样及样品的详细数据,标准曲线显示在右下方,左下方显示ISTD内标稳定图。把鼠标箭头移到数据列表中有颜色的数据,会显示数据出现的问题,如下图所示,该数据超出了标准曲线的定量范围,

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1	-	1.	BLANK_090617.D	2009-6-17 11:58:00	CalBlk	1	5%HN03	€0.000	N/A	0.006	194.4	0.189	0.0	<0.000	NIA	0.021	6.2	0.014	97.5	<()
2	-	1	STD1_090617.D	2009-6-17 12:02:00	CalStd	2	5ppb	5.010	0.6	₩ Fu	IlQuant Out	ier(s)			1.1	5.019	1.2	5.049	1.5	5
3	-	-	STD2_090617.D	2009-6-17 12:05:00	CalStd	4	20ppb	20.000	1.8	Co[1]	Concentration	n xalue = 556.5	i3 is over the c	alibration range	1.6	20.030	1.6	20.038	1.6	19
4	-	1	STD3_090617.D	2009-6-17 12:10:00	CalStd	3	10ppb	9.996	1.0	1,011	1.4	9.649	1.1	9.932	1.5	9.930	1.8	9.900	1.0	10
5			STD4_090617.D	2009-6-17 12:14:00	Sample		H20	17.279	0.1	556.530	0.3	2.082	0.4	0.563	2.3	1.298	0.4	0.033	46.8	3
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14、点击Report菜单下的generate report,出现如下窗口。可选择样品报告或批处理报告及报告模板和报告储存的路径。如安装Acrobat professional (需用户购买),可打印PDF格式报告。

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15、数据分析完成后,关闭数据分析窗口。

七、关机:

- 1、样品采集完成后,先用5%HNO3 冲洗系统5Min,再用DIW 冲洗系统5Min 。可在调谐窗口检查系统是 否冲洗干净
- 2、点击"ICP-MS Top"画面的"ICP-MS Instrument control"图标 , 进入下图所示的仪器控制画面,点击 "Plasma off"图标 , 仪器由Analysis— > Standby 转换。等到仪器进入Standby状态,才可关闭通风, 循环水及氩气开关
- 3、待转换为"Standby"状态后,如需彻底关机,在"ICP-MS Instrument control"画面 点击"Vacuum"菜单,选择"VACUUM OFF"进行放真空程序,仪器由Standby向Shutdown 转换。



- 4、等待仪器转换为"Shutdown"状态(约5-10分钟)。
- 5、关Ar 气、循环水、排风,松开蠕动泵管。
- 6、退出工作站,关PC、显示器、打印机。
- 7、关7700 ICP-MS 左下角电源及仪器背面总电源。

八、维护:

- 1、 定期检查机械泵的油位及颜色,添加或更换油。
- 2、 定期打开机械泵的振气阀使油气过滤器中的泵油流回泵中。
- 3、 循环水应更换,一般次/半年。
- 4、 灵敏度降低需清洗雾室、雾化器、炬管、锥及透镜,请参照维护视频。

****注意:

- 1、本教材仅适用于现场工程师培训讲解参考之用,内容为现场培训的基本 要求。建议使用仪器3个月左右再参加Agilent实验室的操作培训
- 2、安捷伦公司对本教材可能存在的错误及其后果不承担任何法律责任,我 们适时推出新版本的培训教材,恕不另行通知。