Methanol Analysis by ICPAES

SC-FAST System with Syringe Pump Sample Loading and Delivery

Syringe Pumps

➢ O-ring and seal free

➢ Controlled flow rate (µL to mL) of volatile and viscous samples

➢ Continuous flow set-up

➢ PFA or Quartz

Continuous Flow Set-up

Parameter	Setting
Carrier	Methanol
Sample	Methanol
Sample Volume	250 µL
Carrier Flow Rate	50 µL/min

SC / FAST System plus
high purity teflon flow system

SC Autosampler
with FAST &
Syringe Pump

FAST Valve

Syringe Pump 4

Sample Loop

Argon

PFA-ST Nebulizer

Syringe Pump 1

Syringe Pump 2

Valve1

Valve2

Waste

Carrier Solution

Waste

Procedure:
- ➤ Syringe pump 4 loads sample into loop
- ➤ Syringe pumps 1 & 2 provide a continuous stream of carrier
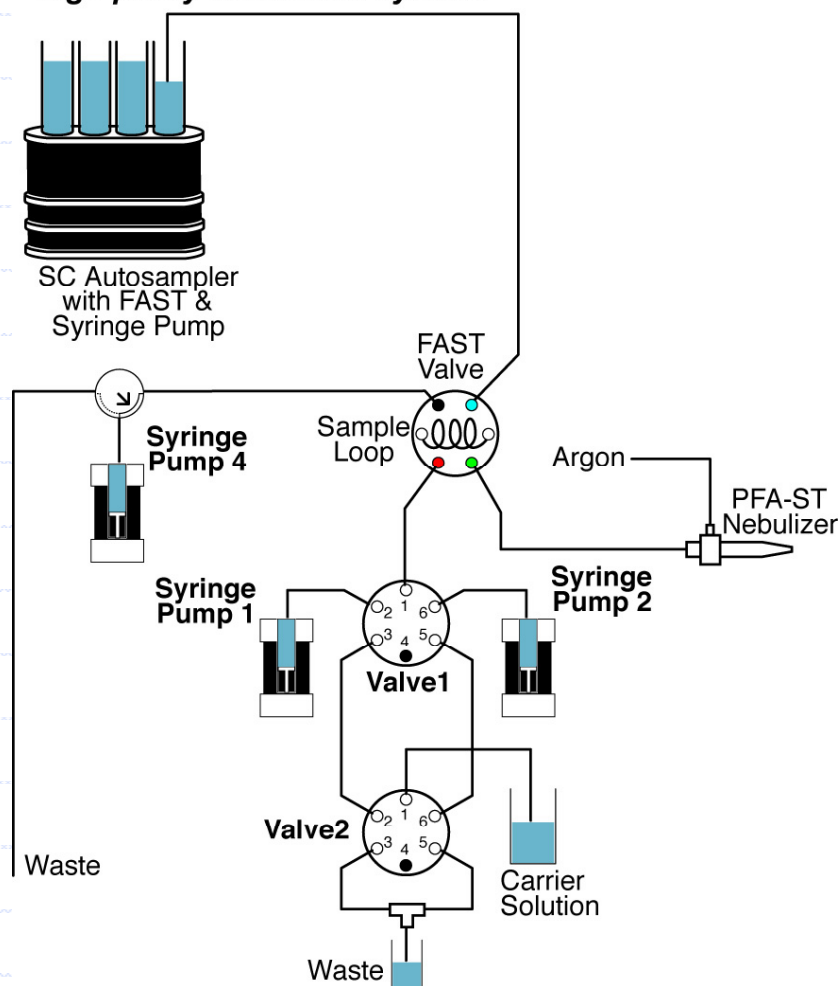
Instrument Set-up

Parameter	Setting
Integration Time	0.1 seconds
Read Time	3 seconds
Plasma Gas	14 L/min
Aux. Gas	0.5 L/min
Nebulizer Gas	0.6 L/min
Power	1500 Watts
View Distance	15 mm
Plasma View	Axial
Nebulizer	PFA-ST
Spray Chamber	Cyclonic

Calibration Set Up

| Element	λ (nm)	Blank	Std 1 (ppm)	Std 2 (ppm)	Std 3 (ppm)
Be	313.107	0.000	0.020	0.050	0.200
Cd	226.502	0.000	0.020	0.050	0.200
Co	228.616	0.000	0.020	0.050	0.200
Cu	324.758	0.000	0.020	0.050	0.200
Mn	257.607	0.000	0.020	0.050	0.200
V	292.402	0.000	0.020	0.050	0.200
Zn	213.854	0.000	0.020	0.050	0.200
Ca	396.847	0.000	0.020	0.050	0.200
Mg	279.553	0.000	0.020	0.050	0.200
Mg	280.271	0.000	0.020	0.050	0.200
Fe	259.939	0.000	0.020	0.050	0.200
Ti	334.94	0.000	0.020	0.050	0.200
Be	234.861	0.000	0.020	0.050	0.200
Mg	285.213	0.000	0.020	0.050	0.200
Ba	233.527	0.000	0.020	0.050	0.200
Cr	267.716	0.000	0.020	0.050	0.200
Cr	283.563	0.000	0.020	0.050	0.200
Cr	284.325	0.000	0.020	0.050	0.200
Ni	341.476	0.000	0.020	0.050	0.200

Calibration Curves
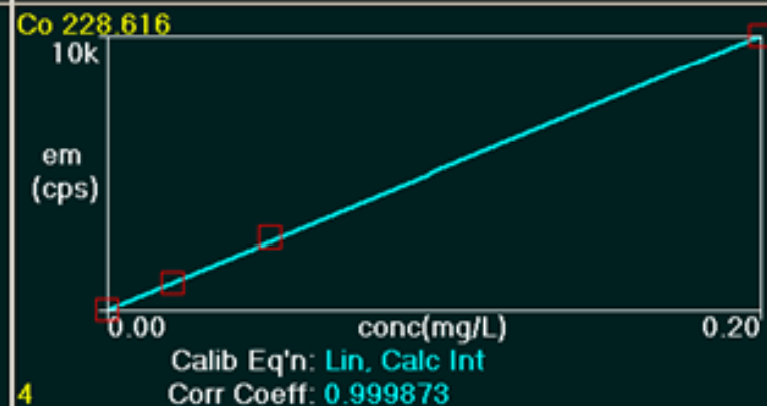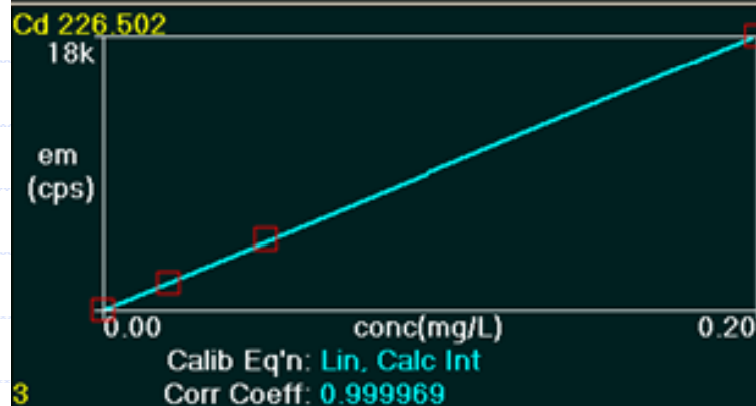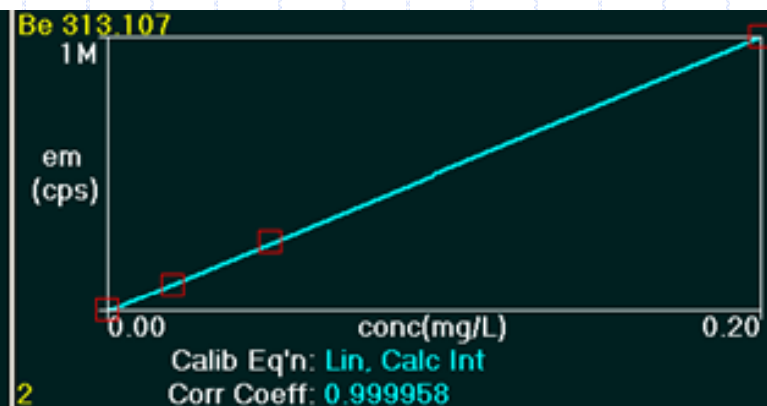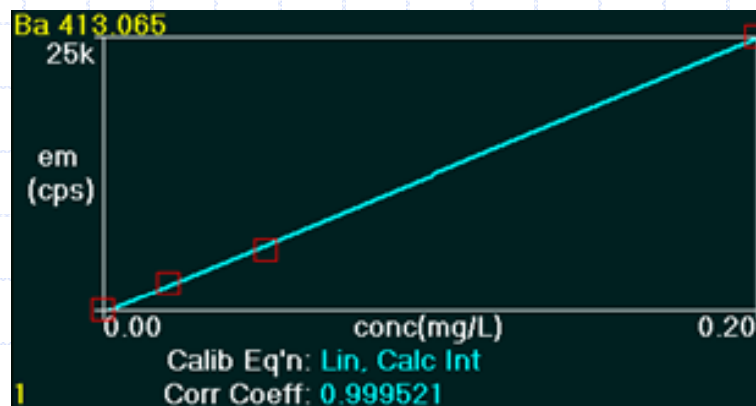
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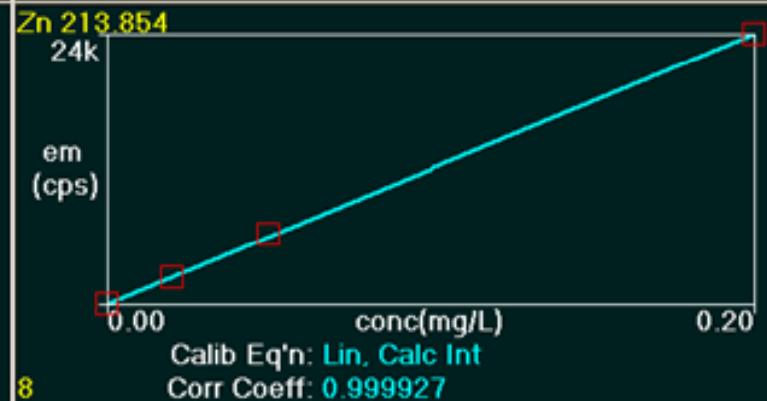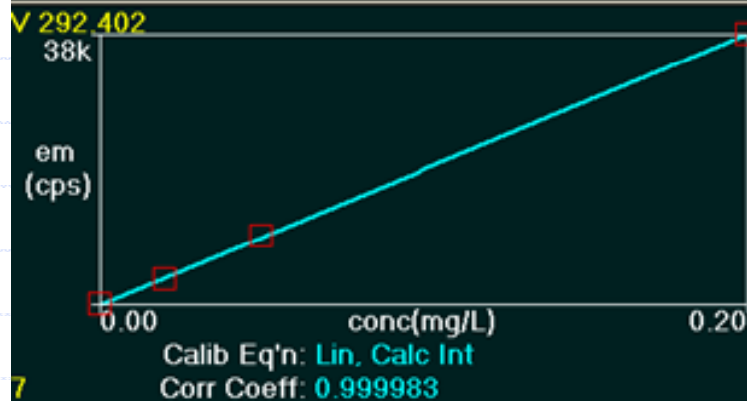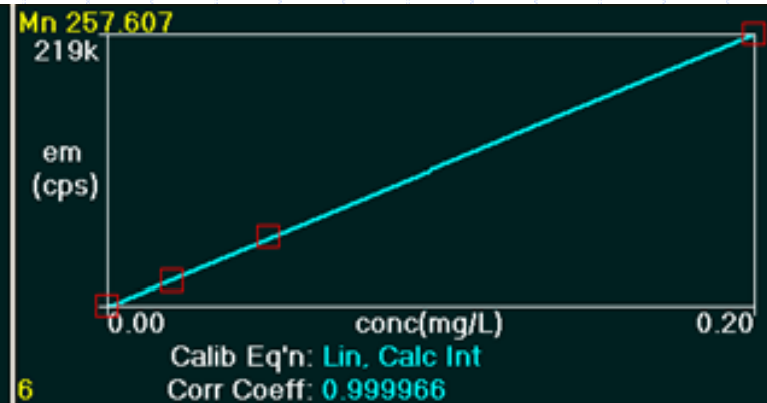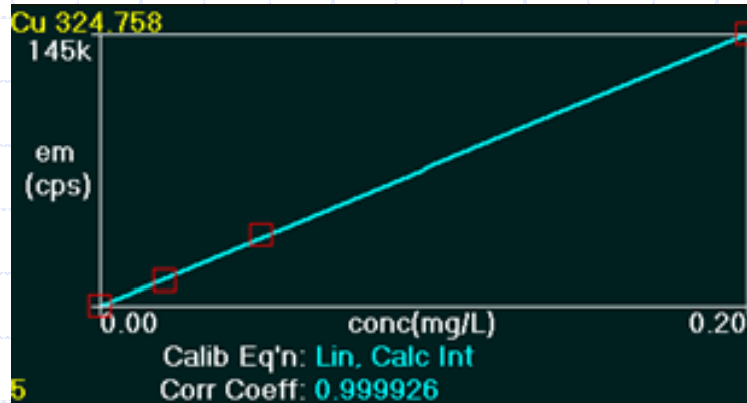
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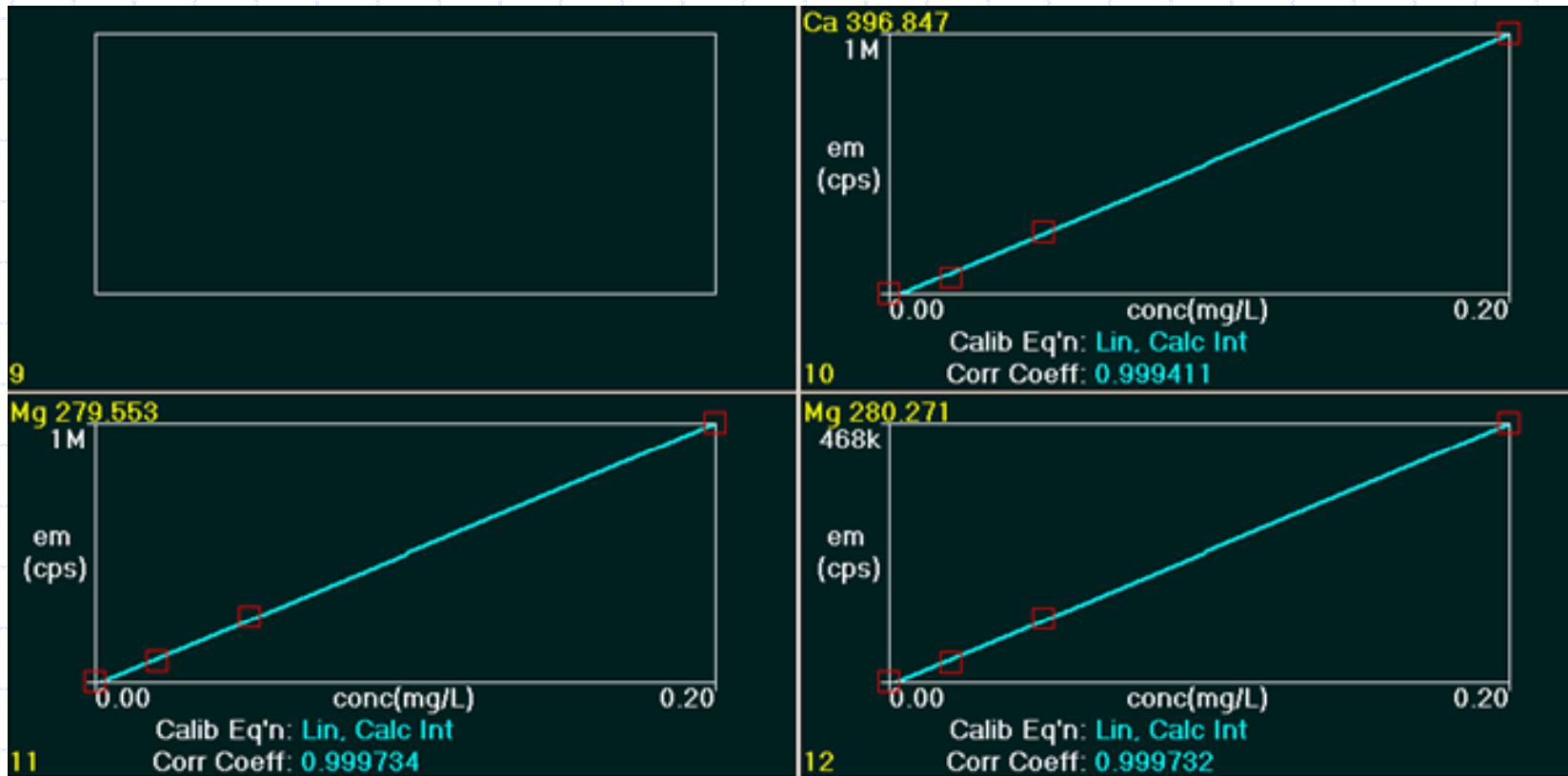
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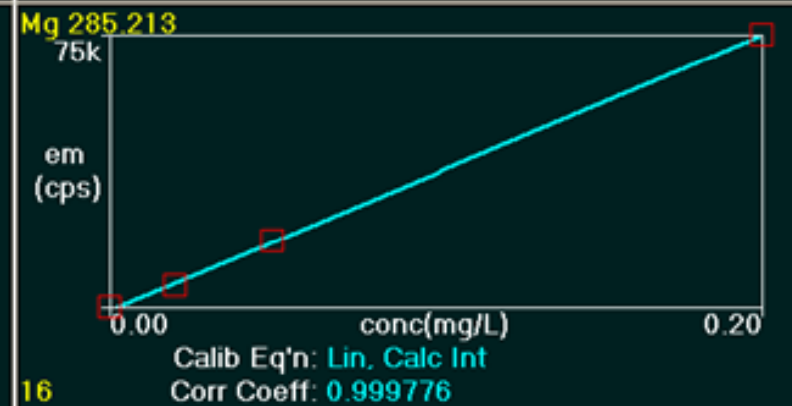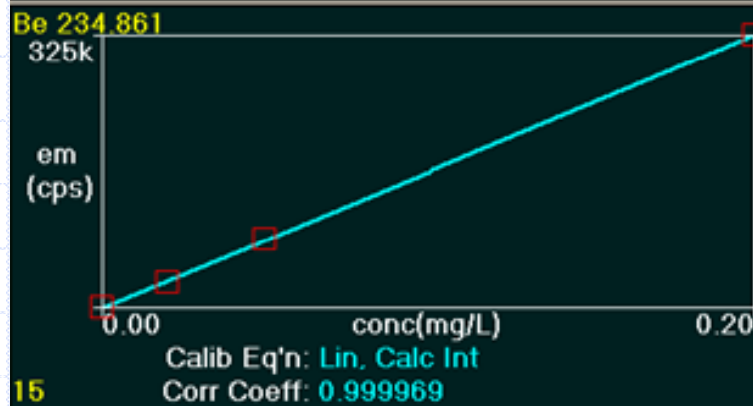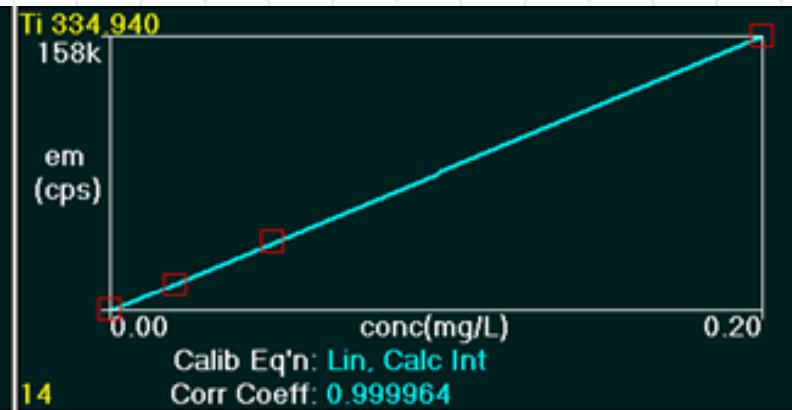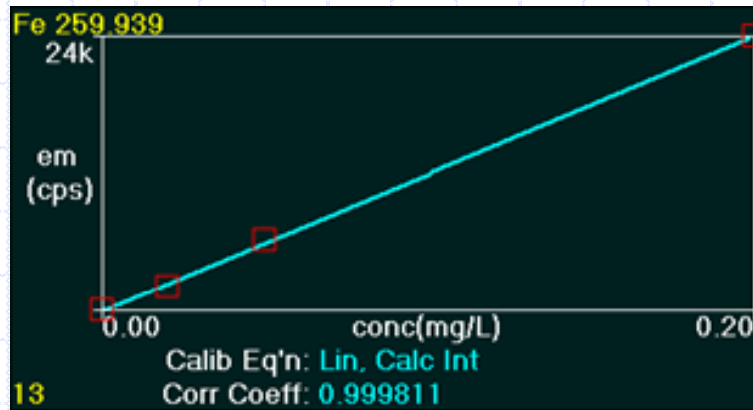
Calibration Curves

50ppb Reproducibility (n = 5)

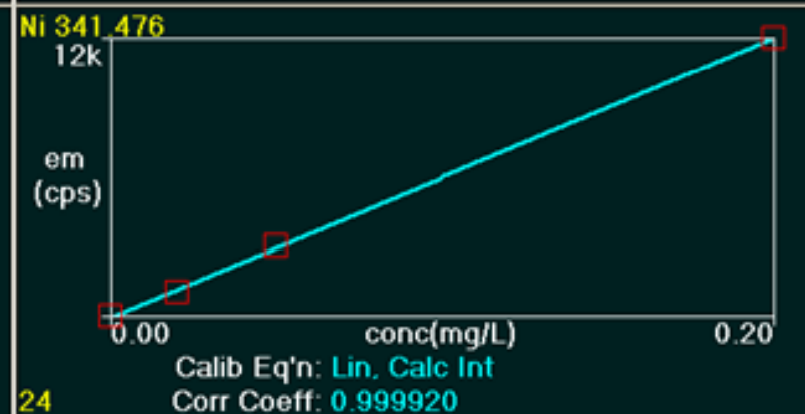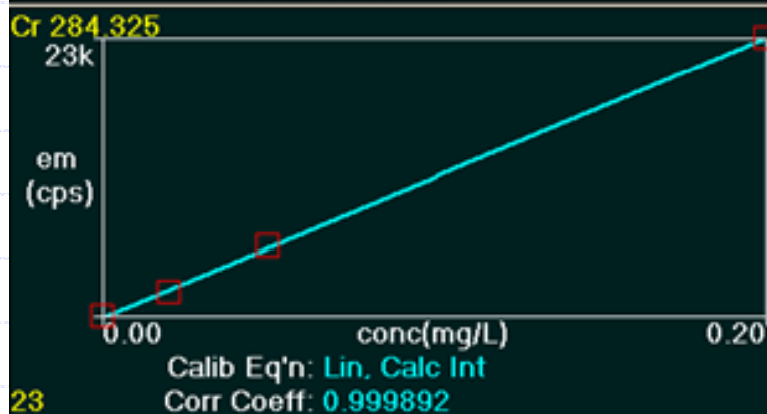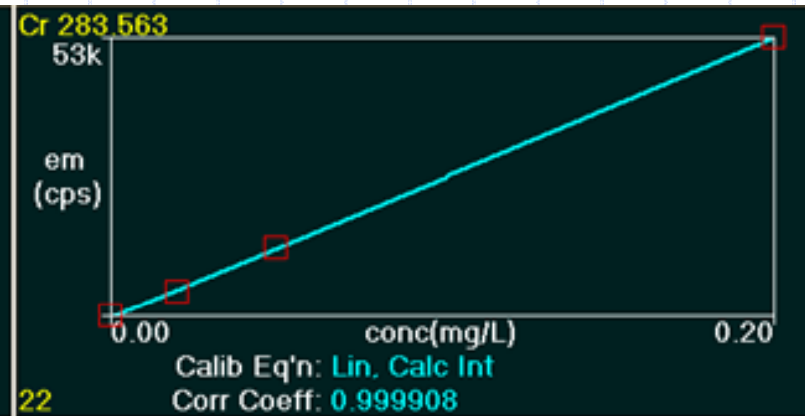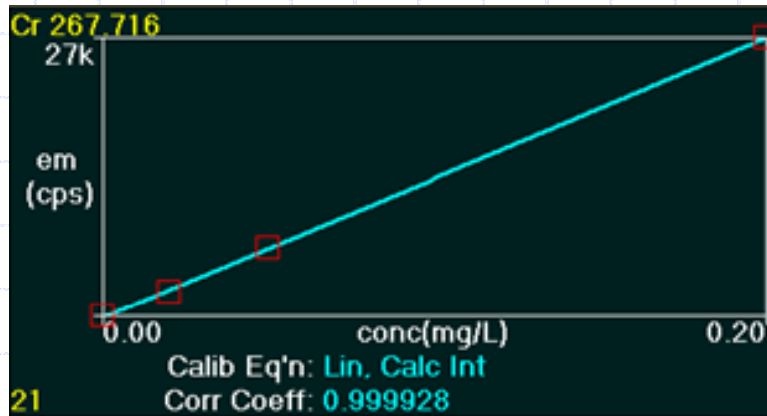| Element	λ (nm)	Average	Std. Dev.	RSD (%)	*LOD (ppb)
Be	313.107	50.1	1.2	2.3	8
Cd	226.502	50.6	1.4	2.7	2
Co	228.616	50.7	1.5	2.9	3
Cu	324.758	51.8	0.5	1.0	1
Mn	257.607	50.3	0.6	1.2	0
V	292.402	50.6	0.6	1.1	0
Zn	213.854	51.5	0.4	0.8	1
Ca	396.847	42.0	3.5	8.4	12
Mg	279.553	48.8	1.6	3.4	5
Mg	280.271	48.2	1.3	2.7	5
Fe	259.939	52.2	0.8	1.6	0
Ti	334.94	50.4	0.9	1.8	1
Be	234.861	51.0	0.0	0.0	0
Mg	285.213	48.6	1.1	2.3	4
Ba	233.527	49.2	0.8	1.7	3
Cr	267.716	49.8	0.4	0.9	2
Cr	283.563	49.6	0.9	1.8	2
Cr	284.325	49.2	1.9	3.9	5
Ni	341.476	50.4	1.1	2.3	4

*LOD = 3 x σ of Blank (n = 5)

Summary

➢ Fully automated set up

➢ Suitable for volatile or viscous organic samples

➢ Stable signals

➢ Good detection limits

➢ Good reproducibility