Multi Base
Multi Range
Calibration

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Degerfors Laboratorium AB

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- Content:
- Short presentation Degerfors Laboratory
- Our definitions of MultiBase, Multi Range
- How to solve it
- Some results

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- Independent, commercial laboratory
- Accreditation (ISO17025) for steel analysis with XRF, OES, AAS and LECO.
- Also analysis on Al, Cu, Ni, Ti and slag
- The result reported, the same day that we got the sample.
- Education

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- Instrumentation

- **1 XRF Thermo/ARL 9800**
- **1 XRF/XRD Thermo/ARL 9900**
- **2 OES, Thermo/ARL 4460,3460**
- **2 CS, LECO CS-600/CS-444**
- **1 NOH LECO TCH-600**
- **1 N LECO TN 114**
- **1 graphite furnace AA**
- **1 Multiphaseanalyzer, LECO RC-412**
- **1 GR-320Lab Gamma spectrometer**
- **Sampleprep: Herzog, Retsch, Heat-tech …**

- **1 XRF Thermo Niton XL3t (IB Products AB)**

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Multi Base, Multi Range

- Solid metal samples
- Steel – Fe-base
- Ni-base
- Co-base

- Range Fe, Ni and Co 0-100%
- Cr 0 - 50%, Mo 0 – 30% …

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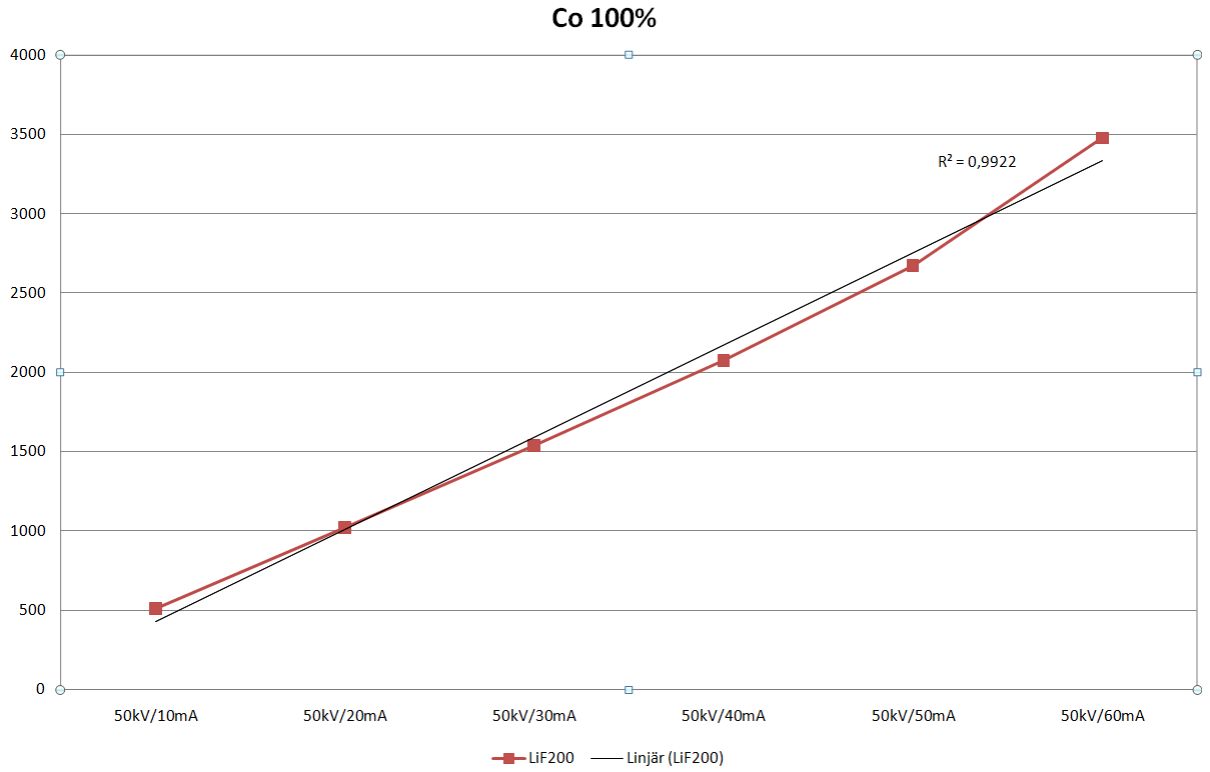
Linearity



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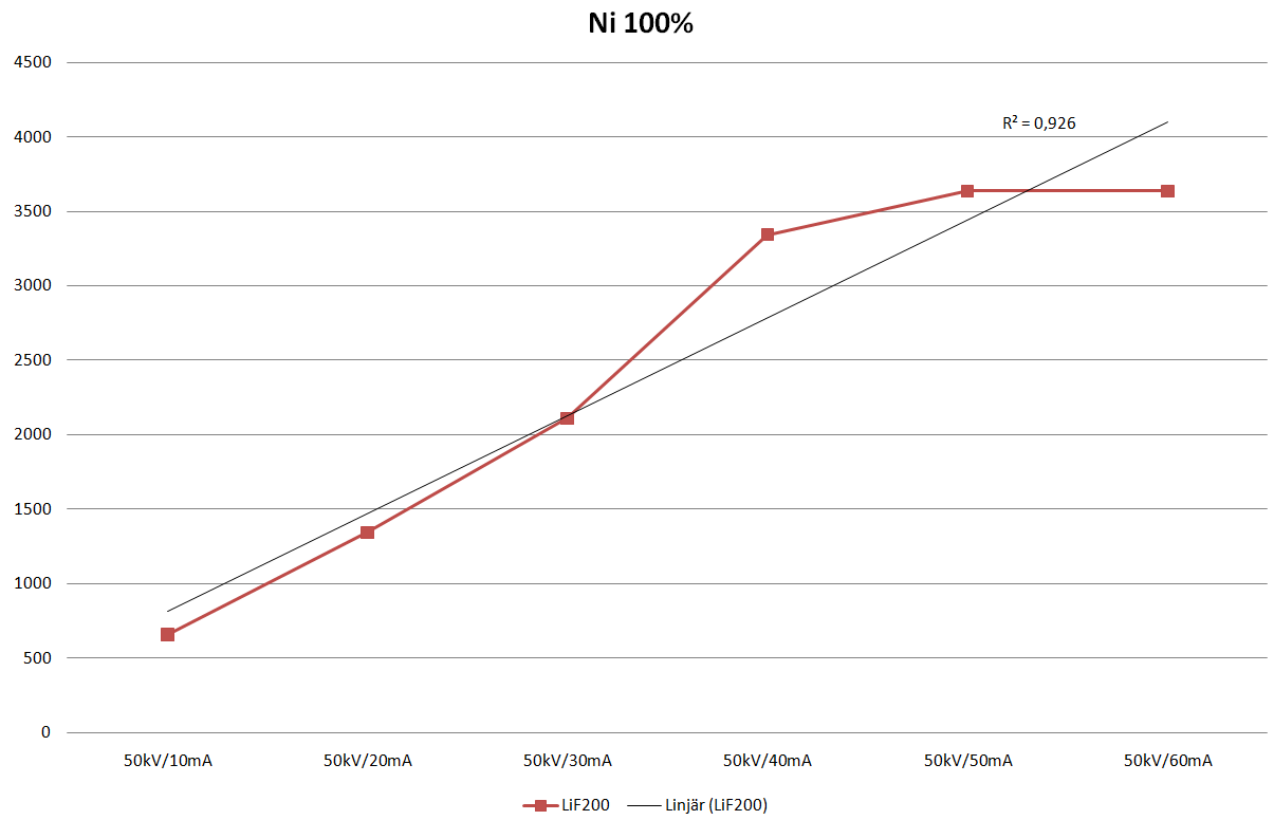

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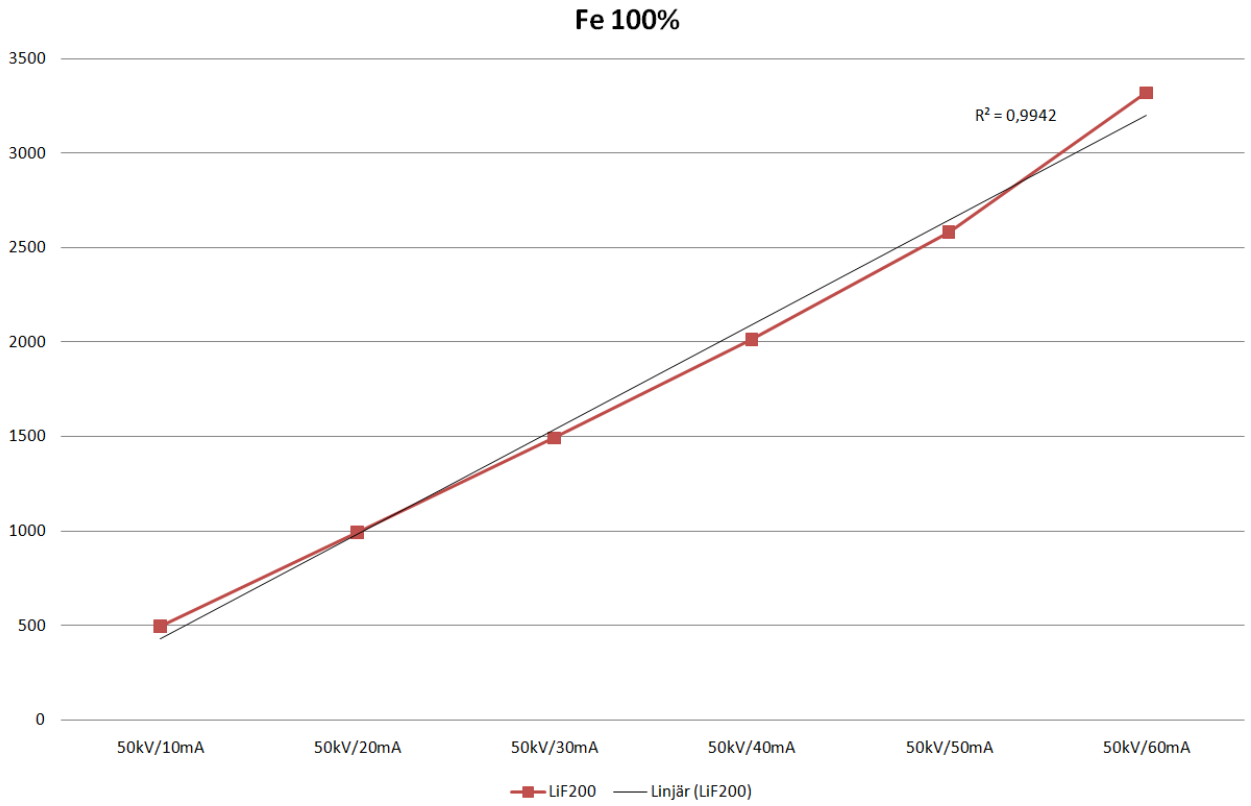

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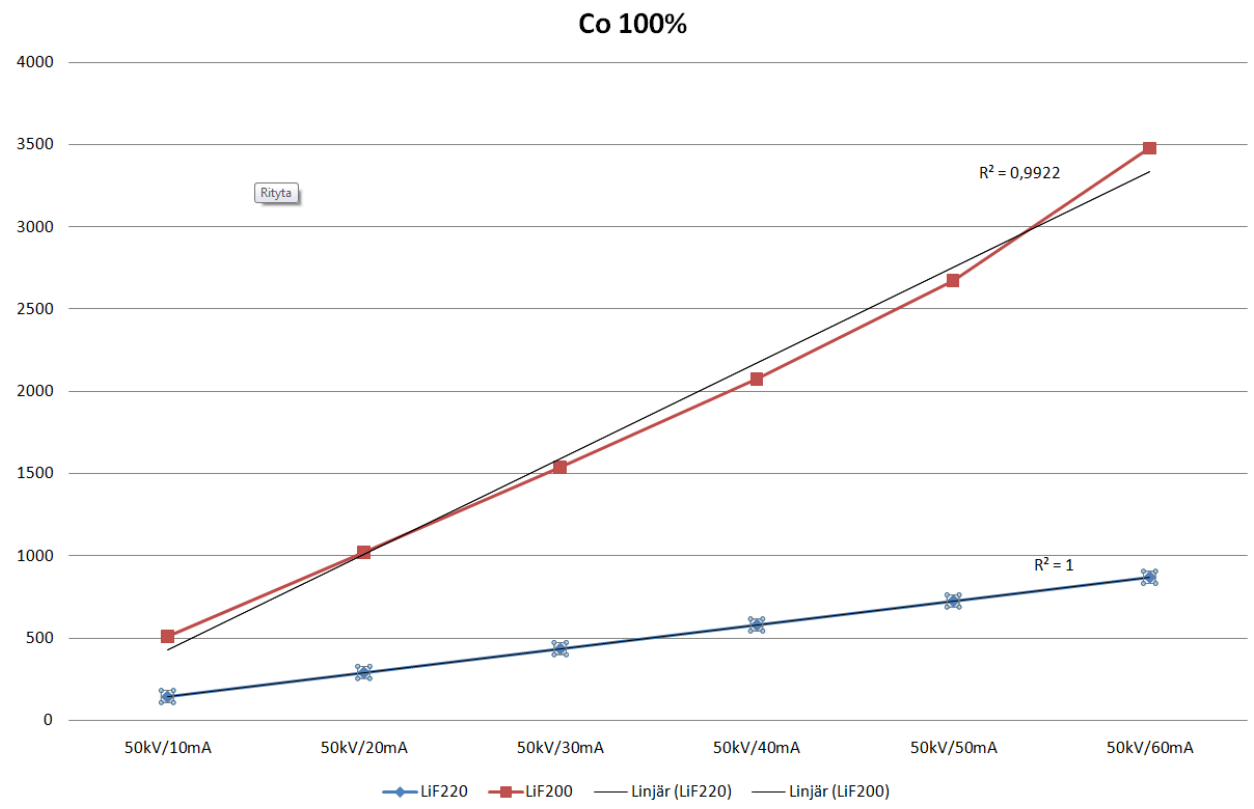
Linearity



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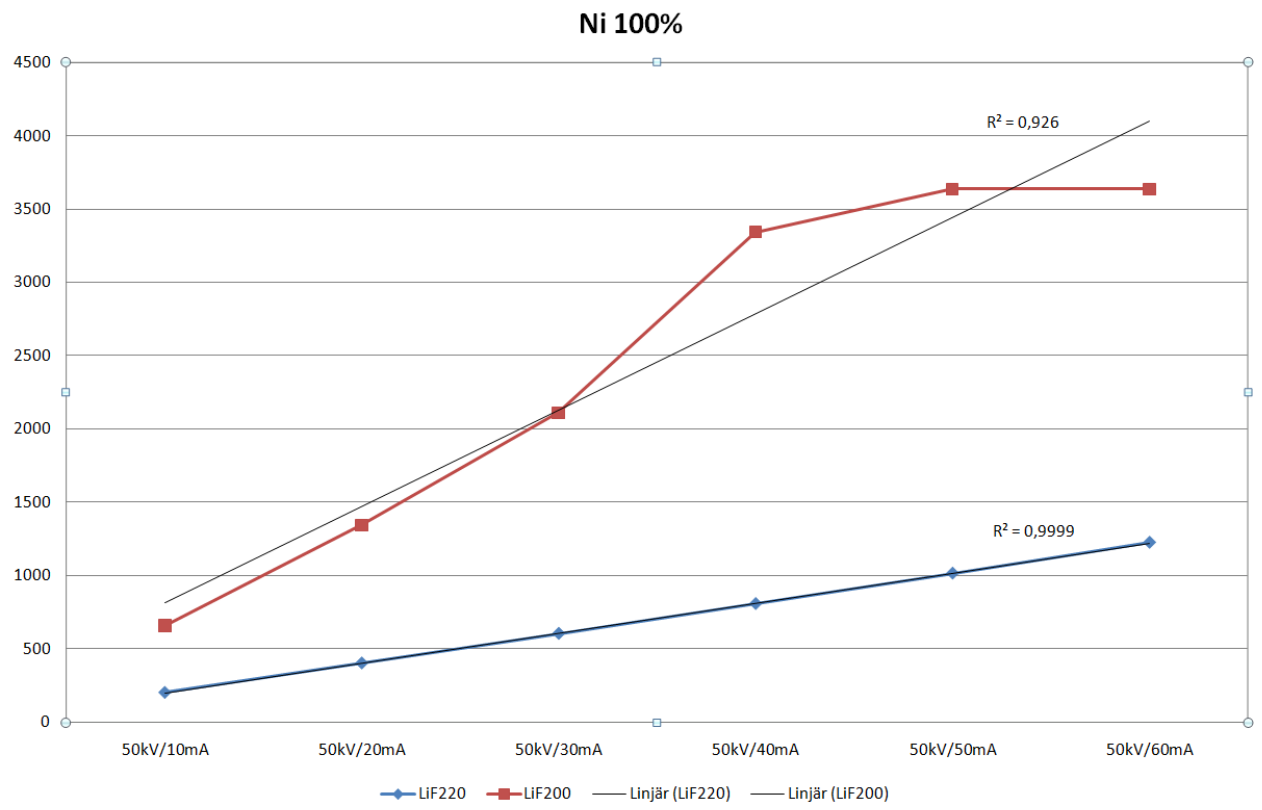

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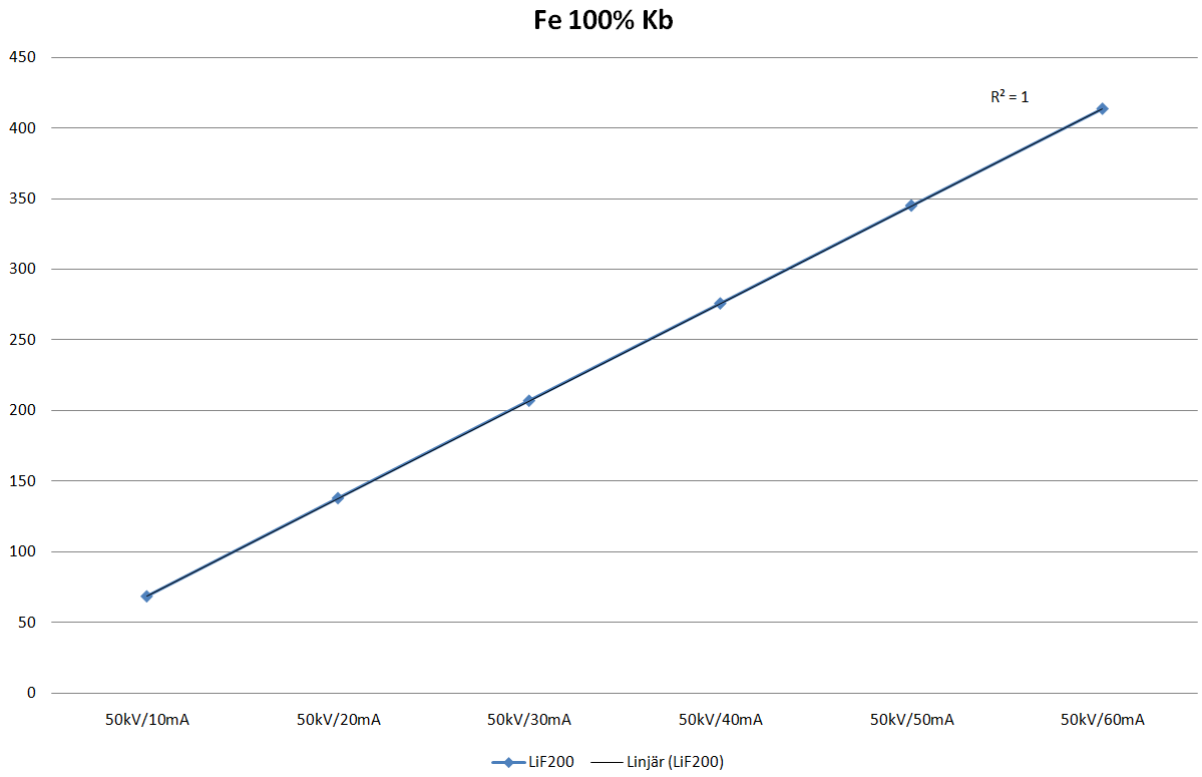
Linearity



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Selected Lines

Analytical Parameters (DLAB10)										
Name	2 Theta		Background		Crystal	Detector	Collimator	PHD		Overlaps
	Theo	Real	Offset Low	Offset High				Threshold[step]	Windows[step] AGC	Cal. Order
Fe Kb 1,3	51.73		0.00000	0.00000	LiF200	FPC	0.25	30	110	7
Ni Ka 1	71.20		0.00000	0.00000	LiF220	SC	0.25	40	100	23
Co Ka 1	77.83		0.00000	0.00000	LiF220	FPC	0.25	30	110	24
Zr Ka 1,2	22.55		0.00000	0.00000	LiF200	SC	0.25	40	100	21
W La 1	43.02		0.00000	0.00000	LiF200	SC	0.25	40	100	20
Ta La 1	44.42		0.00000	0.00000	LiF200	SC	0.25	40	100	17
Sn Ka 1,2	14.04		0.00000	0.00000	LiF200	SC	0.25	40	100	16
Si Ka 1,2	109.03		0.00000	0.00000	PET	FPC	0.60	40	100	15
Sb Ka 1,2	13.46		0.00000	0.00000	LiF200	SC	0.25	40	100	14
Ni Ka 1,2	48.67		0.00000	0.00000	LiF200	SC	0.25	40	100	11
Mo Ka 1,2	20.33		0.00000	0.00000	LiF200	SC	0.25	40	100	9
Fe Ka 1,2	57.52		0.00000	0.00000	LiF200	FPC	0.25	30	110	22
Cr Ka 1,2	69.35		0.00000	0.00000	LiF200	FPC	0.25	30	110	5
Ce La 1	79.01		-0.30000	0.00000	LiF200	FPC	0.25	40	100	3
As Ka 1,2	34.00		0.00000	0.00000	LiF200	SC	0.25	40	100	2
Al Ka 1,2	144.71		0.00000	0.00000	PET	FPC	0.60	40	100	1
Ti Ka 1,2	86.14		0.00000	0.00000	LiF200	FPC	0.25	30	110	18
Nb Ka 1,2	21.40		0.00000	0.00000	LiF200	SC	0.25	40	100	10
V Ka 1,2	76.93		0.00000	0.00000	LiF200	FPC	0.25	30	110	19
S Ka 1,2	75.75		0.00000	0.00000	PET	FPC	0.60	40	100	13
P Ka 1,2	89.44		0.00000	0.00000	PET	FPC	0.60	40	100	12
Mn Ka 1,2	62.97		0.00000	0.00000	LiF200	FPC	0.25	30	110	8
Cu Ka 1,2	45.03		0.00000	0.00000	LiF200	SC	0.25	40	100	6
Co Ka 1,2	52.80		0.00000	0.00000	LiF200	FPC	0.25	30	110	4

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Binaries

- Iron -base

  Cr 1 – 35%, Ni 1 – 40%,

  Mo 1 – 10%, Cu, Al, Sn, Co, V, W, Ti, Nb

  …

- Ni –Base

  Cr, Mo, Co, Ti, Cu …

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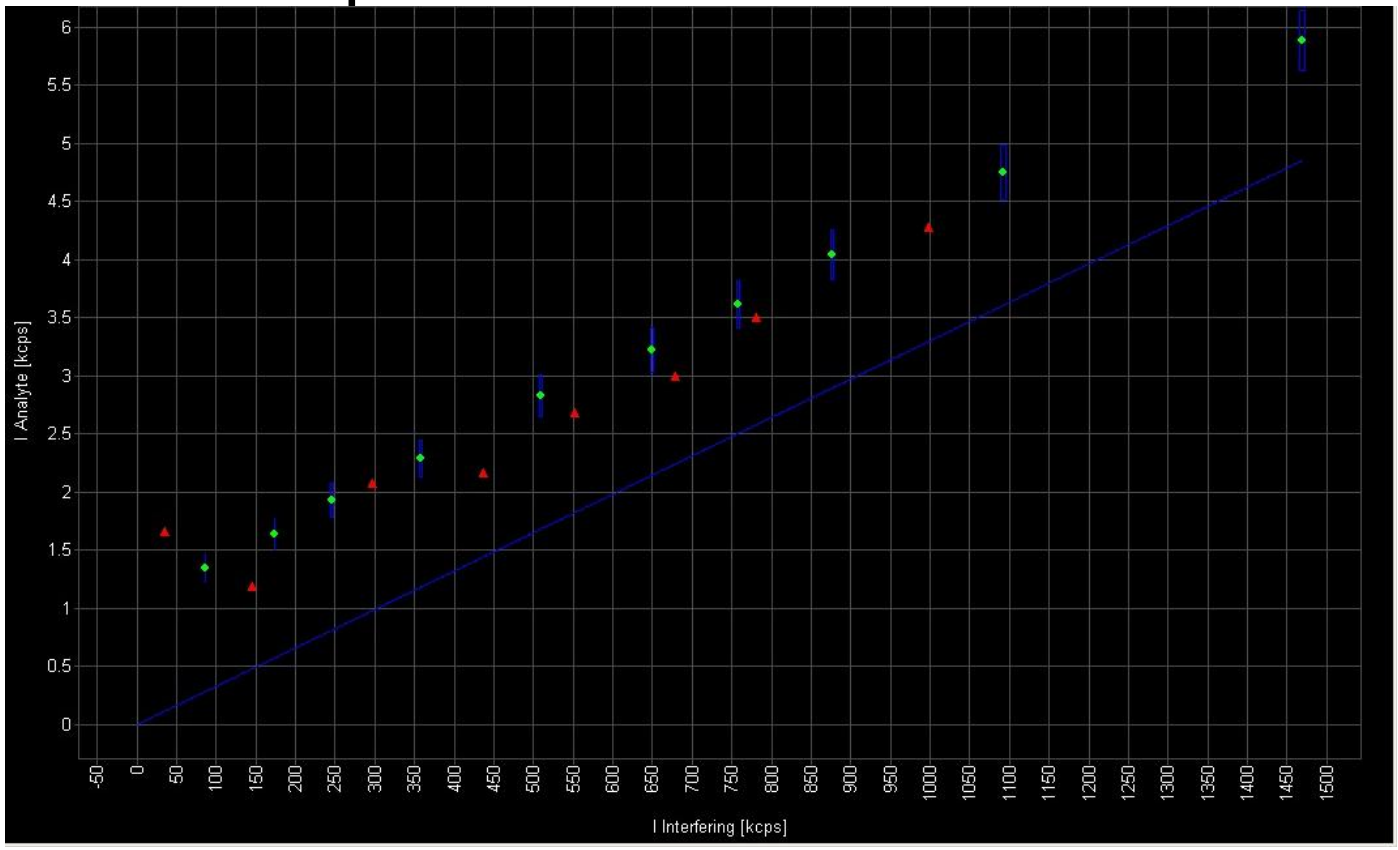
Line overlap

Cr overlap on Mn



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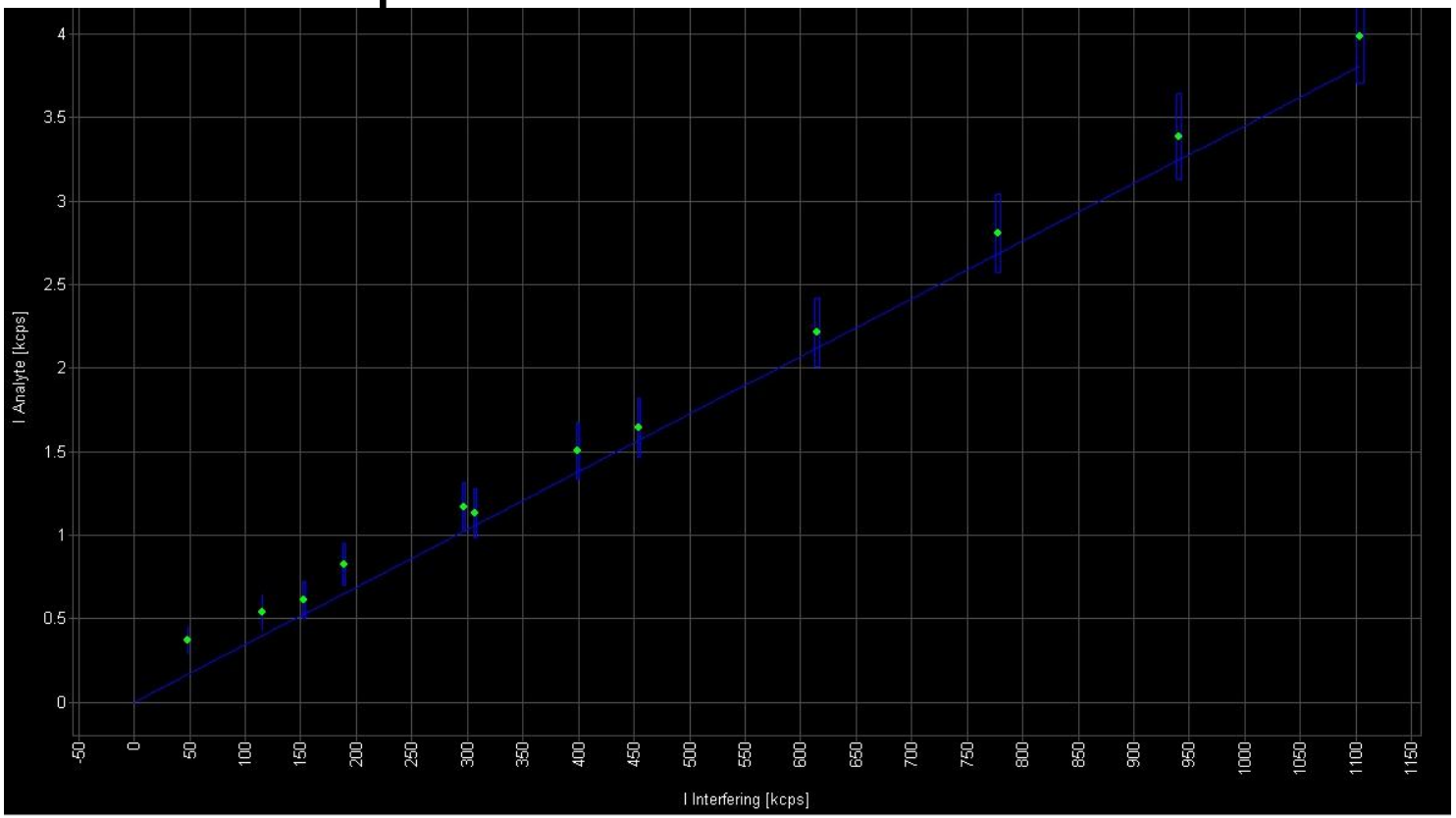
Line overlap

Mo overlap on P



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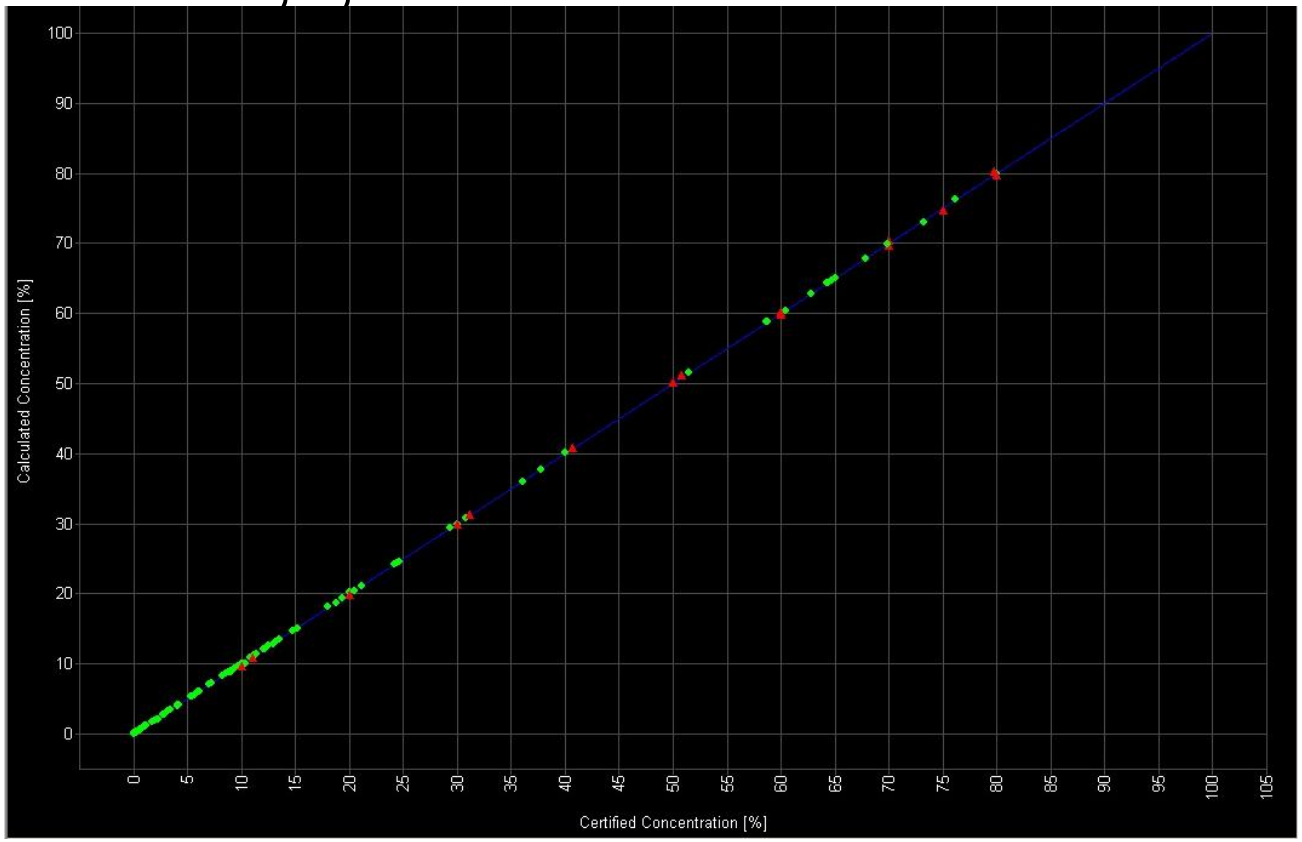
Ni Kα 1,2, LiF 200



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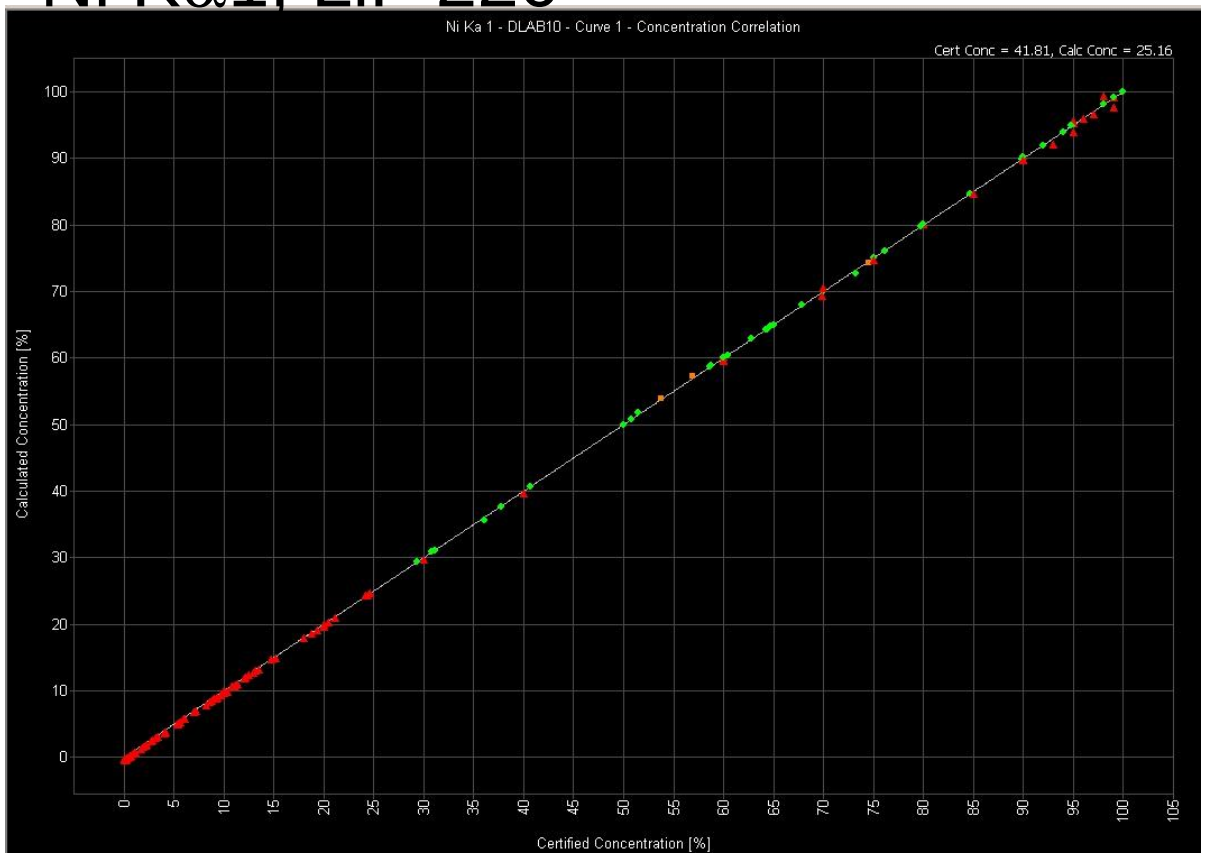
Calibration

Ni Kα1, LiF 220



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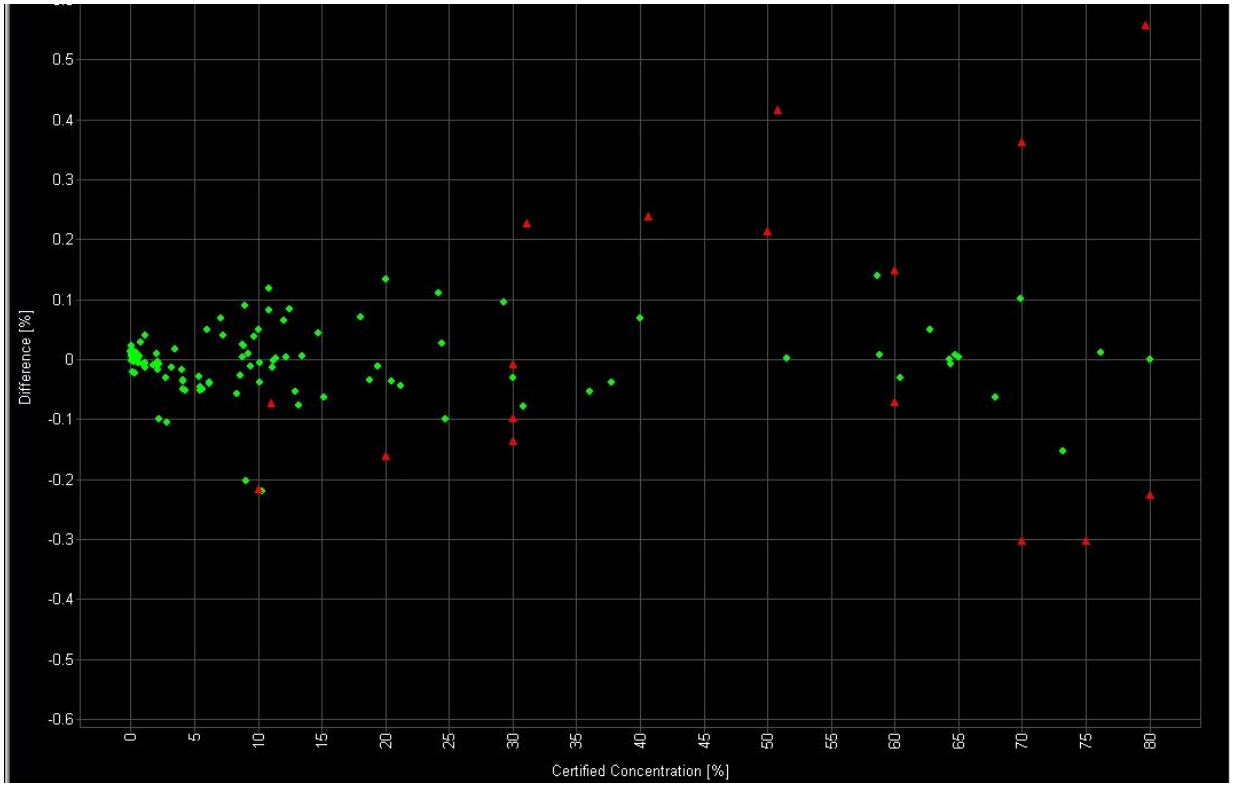
Calibration

Ni Ka 1,2, LiF 200, error correlation



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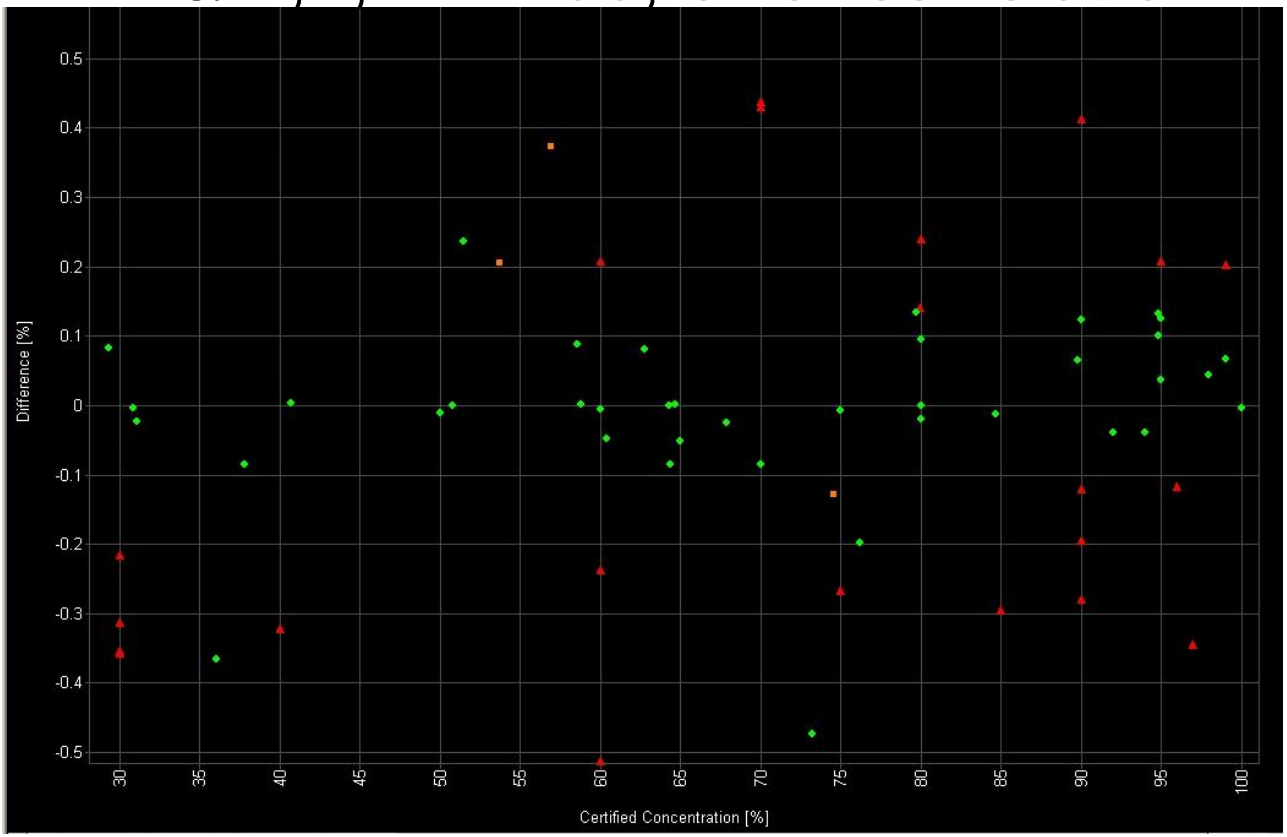

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Result

- Validation is going on at the moment
- The result will be compared automaticly with the result calculated with Multiscat.
- If irrelevant deviations occure further investigations are done before reporting.
- The goal accreditation also for Ni-base alloys.

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