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Metodeutvikling : Deteksjonsgrenser REE,
ICP-MS

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Sammendrag: <p>Alle isotopene Sc45, Y89, La139, Ce140, Pr141, Nd143, Nd146, Sm147, Sm149, Sm152, Eu151, Eu153, Gd157, Gd158, Tb159, Dy161, Dy163, Dy164, Ho165, Er166, Er167, Tm169, Yb172, Yb173, Yb174, Lu175, Th232 som inngikk i denne undersøkelsen har lineære kalibreringskurver i konsentrasjonsområdet 0-10 000 ppt.</p> <p>Deteksjonsgrensene er bestemt ut fra 3 standardavvik til blank prøve (Milli-Q vann). Scandium45 har de dårligste deteksjonsegenskapene, (23 ppt), mens erbium166 har den laveste deteksjonsgrensen (0.22 ppt). Deteksjonsegenskapene kan forbedres ved å koble en kjøler til spraykammeret, (ekstra investering på kr. 20.000,-).</p> <p>Beregninger av korrelasjonskoeffisienter og lineærregresjonskoeffisienter i Finnigans soft ware er verifisert.</p>			
Emneord:	ICP-MS	Meinhard forstøver	
RRE	Deteksjonsgrenser	Statistikk	
Vannanalyser		Fagrapport	

INNHold

1. FORORD / INNLEDNING.....	4
2. EKSPERIMENTELT	4
3. RESULTATER / DISKUSJON	6
3.1 Er kalibreringskurvene lineære i konsentrasjonsområdet??	6
3.2 Regresjonslinjen.....	9
3.3 Deteksjonsgrenser / limits of detection	10
REFERANSER	12

TABELLER

Tabell 1 **Konsentrasjoner med tilhørende telletall og delsummer for beregning av korrelasjonskoeffisienten for Yb172**

Tabell 2 **Korrelasjonskoeffisienten, R , og testobservatoren, t_0 , gitt for alle målte isotoper.**

Tabell 3 **Konsentrasjoner av Sc45, Y89 Th232 og RRE i 10 prøver med Milli-Q vann, surgjort med suprapure HNO₃, gjennomsnitt, ett standardavvik og tre standardavvik (deteksjonsgrense for isotopen)**

VEDLEGG

Vedlegg A Måleprogram «set1.met»

Vedlegg B Måledata, standarder

Vedlegg C Kalibreringskurver

1. FORORD / INNLEDNING

NGU har investert i et høyopløselig induktivt koplet plasma massespektrometer (HR-ICP-MS), Finnigan MAT, Element. Dette er et instrument som gir mulighet for å måle konsentrasjoner ned i ppq området (pg/kg). Arbeidet med å lage metoder, fastsette deteksjonsgrenser og å få oversikt over statistikken benyttet i Finnigan's software pakke har nå begynt. Denne rapporten vil være den første i en rekke som vil ta for seg utviklingen / fremdriften i dette arbeidet.

Vi har startet med vannprøver da de krever minst forarbeid. Denne rapporten tar for seg de sjeldne jordartselementene + Sc , Y og Th. Deler av statistikken brukt i soft waren vil også bli verifisert, da den ikke er dokumentert i soft ware manualene.

2. EKSPERIMENTELT

Sertifiserte Spectrascan enkeltlement standardløsninger fra Teknolab A/S ble benyttet ved fremstilling av standardene. En stamløsning på 1 ppm ble laget utfra følgende Spectrascan løsninger i 1000 ml målekolbe, tilsatt Milli-Q vann (B. Flem, 1997) og 15 ml HNO₃ til merket:

- 1 ml 1000 µg Sc/ml (SS-8055-1,-2.5 % HNO₃)
- 1 ml 1000 µg Y/ml (SS-8070-1,-2.5 % HCl)
- 1 ml 1000 µg La/ml (SS-8037-1,-2.5 % HNO₃)
- 1 ml 1000 µg Ce/ml (SS-8021-1,-2.5 % HNO₃)
- 1 ml 1000 µg Pr/ml (SS-8046-1,-2.5 % HNO₃)
- 1 ml 1000 µg Nd/ml (SS-8074-1,-2.5 % HNO₃)
- 1 ml 1000 µg Sm/ml (SS-8057-1,-2.5 % HNO₃)
- 1 ml 1000 µg Eu/ml (SS-8027-1,-2.5 % HNO₃)
- 1 ml 1000 µg Gd/ml (SS-8029-1,-2.5 % HNO₃)
- 1 ml 1000 µg Tb/ml (SS-8061-1,-2.5 % HNO₃)
- 1 ml 1000 µg Dy/ml (SS-8025-1,-2.5 % HNO₃)
- 1 ml 1000 µg Ho/ml (SS-8033-1,-2.5 % HNO₃)
- 1 ml 1000 µg Er/ml (SS-8026-1,-2.5 % HNO₃)
- 1 ml 1000 µg Tm/ml (SS-8066-1,-2.5 % HNO₃)
- 1 ml 1000 µg Yb/ml (SS-8071-1,-2.5 % HNO₃)
- 1 ml 1000 µg Lu/ml (SS-8039-1,-2.5 % HNO₃)
- 1 ml 1000 µg Th/ml (SS-8063-1,-2.5 % HNO₃)

Følgende standarder ble laget:

10 ppb 100 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 1 ppm stamløsning og 1.5 ml HNO₃.

5 ppb 1000 ml målekolbe fylles til merket med Milli-Q vann, 5 ml 1 ppm stamløsning og 15 ml HNO₃.

1 ppb 1000 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 1 ppm stamløsning og 15 ml HNO₃.

500 ppt 100 ml målekolbe fylles til merket med Milli-Q vann, 5 ml 10 ppb standardløsning og 1.5 ml HNO₃.

100 ppt 100 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 10 ppb standardløsning og 1.5 ml HNO₃.

50 ppt 100 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 5 ppb standardløsning og 1.5 ml HNO₃.

10 ppt 100 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 1 ppb standardløsning og 1.5 ml HNO₃.

1 ppt 100 ml målekolbe fylles til merket med Milli-Q vann, 1 ml 100 ppt standardløsning og 1.5 ml HNO₃.

0 ppt 500 ml målekolbe fylles til merket med Milli-Q vann og 7.5 ml suprapure HNO₃.

ICP-MS instrumentet (Finnigan MAT-Element) ble tunet og kalibrert i henhold til prosedyre gitt av Finnigan.

Standardene 0 ppt - 10 ppb, samt 10 prøver med surgjort Milli-Q vann ble overført til målerør i prøveveksleren (CETAC ASX-500) etter at målerøret var skyllet med løsningen en gang. Opptakstiden før «scanet» ble startet var satt til 90 sekunder og skylletiden mellom hver prøve var 30 sekunder.

Det ble benyttet en standard Meinhard forstøver med tilhørende spraykammer uten kjøling.

Måleprogrammet er gitt i vedlegg A.

3. RESULTATER / DISKUSJON

Måleresultatene for standardene samt kalibreringskurver er gitt i vedlegg B og C. Alle kalibreringskurver er plottet ved hjelp av lineærregresjon.

3.1 Er kalibreringskurvene lineære i konsentrasjonsområdet??

For å finne hvor godt de eksperimentelle punktene passer til en rett linje kan vi beregne korrelasjonskoeffisienten R . De individuelle punktene som inngår i kalibreringskurven vil heretter bli referert til som (x_1, y_1) (0 ppt), (x_2, y_2) , ..., (x_9, y_9) . Korrelasjonskoeffisienten kan skrives som:

$$R = \frac{\sum_i \{(x_i - \bar{x})(y_i - \bar{y})\}}{\{[\sum_i (x_i - \bar{x})^2 \sum_i (y_i - \bar{y})^2]\}^{1/2}}$$

Som et eksempel vil vises beregningen av korrelasjonskoeffisienten til Yb172. Delsummene presentert i tabell 1 gjør dette enklere.

Tabell 1 Konsentrasjoner med tilhørende telletall og delsummer for beregning av korrelasjonskoeffisienten for Yb172

x_i [ppt]	y_i [cps]	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$	$(x_i - \bar{x})(y_i - \bar{y})$
0	0.8	-1851.22	-43634.0	3427023.7	1903923047	80776169
1	18.8	-1850.22	-43616.0	3423322.3	1902352548	80699231
10	258.3	-1841.22	-43376.5	3390099.3	1881517860	79865714
50	1142.5	-1801.22	-42492.3	3244401.5	1805592726	76538015
100	2470	-1751.22	-41164.8	3066779.3	1694538015	72088654
500	11758.3	-1351.22	-31876.5	1825801.5	1016109127	43072190
1000	23373.5	-851.22	-20261.3	724579.3	410518927	17246840
5000	118629.6	3148.78	74994.8	9914801.5	5624225027	236142065
10000	235061.1	8148.78	191426.3	66402579.3	36644041093	1559890651
		0	0	95419388	52882818371	2246319529

Korrelasjonskoeffisienten for kalibreringskurven til isotopen Yb172 blir da:

$$R = \frac{2246319529}{(95419388 \cdot 52882818371)^{1/2}}$$
$$= 0.999991$$

Soft waren til Finnigan oppgir korrelasjonskoeffisienten til 0.99999. I Finnigans software blir R bare gitt med 5 desimaler, dette kan i noen tilfeller være for lite, slik at korrelasjonskoeffisienten blir oppgitt lik 1.0 (Sm149).

Korrelasjonskoeffisienten alene kan ikke gi et sikkert svar på om kalibreringskurven er lineær, i tillegg bør man plote kurven og gjøre en student t -test. Testobservatoren t_0 , vil her være lik:

$$t_0 = \frac{|R|\sqrt{(n-2)}}{\sqrt{(1-R^2)}}$$

og er student t -fordelt med 8 frihetsgrader, Box et al. (1978). Nullhypotesen er i dette tilfellet at det ikke er noen korrelasjon mellom x (konsentrasjon) og y . (telletall). Dersom t_0 er større enn $t_{\alpha/2, 8}$ forkastes null hypotesen. Det vil si at det finnes en signifikant korrelasjon.

$$t_{\alpha/2, 8} = t_{0.025, 8} = 2.31 < t_{0, Yb172} = 652.8$$

Yb172 har altså en lineær kalibreringskurve i konsentrasjonsområdet 0-10 000 ppt

I tabell 2 er korrelasjonskoeffisienten og testobservatoren t_0 gitt for alle isotoper som er undersøkt. Man kan fra tabellen se at alle kalibreringskurvene har en signifikant lineær korrelasjon mellom konsentrasjonen, x , og telletall, y . Testobservatoren t_0 , er større enn $t_{0.025, 8}$ for alle isotoper.

Tabell 2 Korrelasjonskoeffisienten, R , og testobservatoren, t_0 , gitt for alle målte isotoper.

Isotop	R	t_0	Isotop	R	t_0
Sc45(LR)	0.999958463	310.31	Dy161(LR)	0.999978086	427.23
Y89(LR)	0.999991212	674.64	Dy163(LR)	0.999972313	380.08
La139(LR)	0.999969117	359.88	Dy164(LR)	0.999970501	368.23
Ce140(LR)	0.999985989	534.30	Ho165(LR)	0.99997736	420.33
Pr141(LR)	0.999994712	869.73	Er166(LR)	0.999992852	748.06
Nd143(LR)	0.999942117	262.87	Er167(LR)	0.999999431	2650.39
Nd146(LR)	0.999971809	376.68	Tm169(LR)	0.999967302	349.75
Sm147(LR)	0.999981194	461.18	Yb172(LR)	0.999990615	652.85
Sm149(LR)	0.999997087	1171.91	Yb173(LR)	0.999992722	741.33
Sm152(LR)	0.999983032	485.53	Yb174(LR)	0.999987365	562.65
Eu151(LR)	0.999979019	436.62	Lu175(LR)	0.999984804	513.04
Eu153(LR)	0.999956195	302.17	Th232(LR)	0.997131124	37.26
Gd157(LR)	0.999994606	861.15			
Gd158(LR)	0.999993424	779.92			
Tb159(LR)	0.999989728	624.01			

3.2 Regresjonslinjen

Det ble i kapittel 3.1 vist at alle isotopene i tabell 2 har kalibreringskurver med lineært forløp i det aktuelle konsentrasjonsområdet. En rett linje kan matematisk uttrykkes som:

$$y = bx + a$$

Hvor b er stigningstallet og a er skjæringen med y-aksen. Stigningstallet kan beregnes ut fra ligningen:

$$b = \frac{\sum_i \{(x_i - \bar{x})(y_i - \bar{y})\}}{\sum_i (x_i - \bar{x})^2}$$

og a , skjæringen med y-aksen, kan da beregnes som:

$$a = \bar{y} - b\bar{x}$$

Brukes delsummene i tabell 1 for isotopen Yb172 i ligningen for b og a får man at :

$$b = 23.54 \text{ cps/ppt}$$

$$a = 54.14 \text{ cps}$$

som stemmer overens med verdier oppgitt av instrumentets software, Bilag C.

3.3 Deteksjonsgrenser / limits of detection

En vanlig definisjon i litteraturen, J.C Miller og J.N. Miller (1988), er at deteksjonsgrensen er den analyttkonsentrasjonen som gir et instrumentsignal (y) signifikant forskjellig fra blank eller bakgrunnssignalet. Kriteriet settes ofte som:

$$y - y_{\text{Blank}} = 3\sigma_{\text{Blank}}$$

I tabell 3 er resultatene for 10 prøver med Milli-Q vann (smp10-smp19) gitt. Prøven smp10 er kjørt etter 10 ppb standardløsningen med skylletid 30 sek. og opptakstid 90 sek., dette ser ut til å være tilstrekkelig da ingen av prøvene viser tegn til «memory effect» på noen av de målte isotopene. I tabell 1 er også gjennomsnittlig konsentrasjon, ett standardavvik og tre standardavvik gitt for alle isotoper. Standardavviket er beregnet etter følgende ligning:

$$\sigma = \sqrt{\frac{(x_{10} - \bar{x})^2 + \dots + (x_{19} - \bar{x})^2}{10 - 1}}$$

Deteksjonsgrensen for isotopen settes lik 3σ . Utfra tabell 1 kan man se at Sc45 og Th232 har de dårligste deteksjonsgrensene, deretter kommer Gd157, Ce140 og Nd143. De øvrige isotopene har alle deteksjonsgrenser under 1 ppt. Er166 har den laveste deteksjonsgrensen på 0.22 ppt (220 ppq).

Vil man bedre deteksjonsegenskapene anbefales det å ha stabil kjøling på spraykammeret, ± 0.001 °C. Ved å kjøle spraykammeret ned til 8 °C får man et tørrere plasma og reduserer dermed graden av interferenser fra løsmiddelet (t.d vann), man får et mere stabilt plasma og følsomheten øker (for In115 vil telletallet for en 10 ppb løsning øke fra ca. 900.000 til 1.5-2 mill cps). NGU har i dag ikke kjøler tilgjengelig for kjøling av spraykammeret.

Tabell 3 Konsentrasjoner av Sc45, Y89 Th232 og RRE i 10 prøver med Milli-Q vann, surgjort med suprapure HNO₃, gjennomsnitt, ett standardavvik og tre standardavvik (deteksjonsgrense for isotopen)

Isotop	smp10 ppt	smp11 ppt	smp12 ppt	smp13 ppt	smp14 ppt	smp15 ppt	smp16 ppt	smp17 ppt	smp18 ppt	smp19 ppt	\bar{x} ppt	σ_x ppt	$3\sigma_x$ ppt
Sc45	32.885	11.403	22.638	8.75	13.283	12.418	17.54	8.172	11.039	19.94	15.807	7.65	22.95
Y89	-7.278	-7.901	-7.888	-8.11	-7.901	-7.94	-7.914	-7.976	-8.058	-7.745	-7.871	0.23	0.69
La139	-15.951	-16.628	-16.659	-16.469	-16.755	-16.681	-16.789	-16.892	-16.829	-16.76	-16.641	0.27	0.81
Ce140	-11.889	-13.014	-12.901	-13.094	-13.23	-13.287	-13.082	-13.219	-13.333	-13.217	-13.027	0.42	1.26
Pr141	-5.835	-6.159	-6.128	-6.177	-6.251	-6.223	-6.196	-6.269	-6.269	-6.26	-6.177	0.13	0.39
Nd143	-12.164	-13.149	-13.322	-13.106	-13.257	-12.651	-13.03	-12.51	-13.106	-13.03	-12.933	0.37	1.11
Nd146	-7.128	-7.276	-7.451	-7.369	-7.451	-7.294	-7.112	-7.49	-7.2	-7.358	-7.313	0.13	0.40
Sm147	-4.169	-4.255	-4.109	-4.436	-4.341	-4.497	-4.617	-4.617	-4.548	-4.617	-4.421	0.19	0.58
Sm149	-3.822	-3.962	-3.87	-4.087	-3.962	-4.012	-3.97	-4.012	-3.955	-4.087	-3.974	0.08	0.25
Sm152	-6.047	-6.805	-6.977	-6.908	-6.873	-6.805	-7.115	-6.839	-7.218	-6.977	-6.856	0.31	0.94
Eu151	-5.547	-5.908	-5.83	-5.988	-5.953	-5.888	-5.876	-5.947	-5.733	-5.997	-5.867	0.14	0.41
Eu153	-10.136	-10.769	-10.751	-10.842	-10.842	-10.842	-10.896	-10.842	-10.932	-10.896	-10.775	0.23	0.69
Gd157	3.259	3.356	3.029	2.2	2.321	1.982	1.831	2.056	1.94	2.064	2.404	0.58	1.74
Gd158	-1.382	-2.305	-2.384	-2.18	-2.217	-2.426	-2.426	-2.226	-2.467	-2.342	-2.236	0.32	0.95
Tb159	-8.33	-8.488	-8.492	-8.574	-8.612	-8.583	-8.572	-8.579	-8.584	-8.635	-8.545	0.09	0.27
Dy161	-6.643	-6.675	-6.88	-6.82	-6.757	-6.716	-6.88	-6.921	-6.962	-6.925	-6.818	0.11	0.34
Dy163	-3.516	-3.866	-3.897	-3.711	-3.831	-3.831	-3.959	-3.928	-3.959	-3.897	-3.840	0.14	0.41
Dy164	-5.983	-6.165	-6.22	-6.298	-6.324	-6.357	-6.302	-6.235	-6.383	-6.383	-6.265	0.12	0.37
Ho165	-8.541	-8.777	-8.848	-8.816	-8.832	-8.873	-8.837	-8.842	-8.863	-8.824	-8.805	0.10	0.29
Er166	-2.378	-2.284	-2.284	-2.401	-2.472	-2.448	-2.495	-2.378	-2.448	-2.448	-2.404	0.07	0.22
Er167	2.494	2.469	2.187	2.013	2.112	2.088	1.974	2.093	2.043	1.974	2.145	0.19	0.57
Tm169	-10.777	-11.129	-11.164	-11.172	-11.149	-11.196	-11.133	-11.188	-11.133	-11.164	-11.121	0.12	0.37
Yb172	-1.946	-2.055	-2.224	-2.123	-2.158	-2.166	-2.229	-2.123	-2.229	-2.099	-2.135	0.09	0.27
Yb173	-3.417	-3.707	-3.658	-3.713	-3.707	-3.755	-3.858	-3.762	-3.762	-3.81	-3.715	0.12	0.36
Yb174	-4.891	-4.567	-5.088	-5.063	-5.041	-5.091	-5.058	-5.166	-5.191	-5.134	-5.029	0.18	0.55
Lu175	-7.351	-7.626	-7.69	-7.699	-7.745	-7.763	-7.754	-7.699	-7.699	-7.708	-7.673	0.12	0.36
Th232	42.13	32.951	31.296	30.604	30.129	30.06	30.032	29.682	29.627	29.459	31.597	3.84	11.53

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J.C. Miller and J.N. Miller, «Statistics for Analytical Chemistry», Ellis Horwood Limited, John Wiley & Sons, 2.ed, (1988)

VEDLEGG A

Måleprogram «set1.met»

Runs/Passes (Meas.) : 3 * 5 + 0 * 0 + 0 * 0
 Runs/Passes (Eval.) : 3 * 5 + 0 * 0 + 0 * 0
 Resol. Idle Time [sec] : 2 , 2 , 2

Resolution	Isotope	Accurate Mass	Mass Window	Mass Range	Magnet Mass	Scan Type	Segment Duration	Settling Time	Sample Time	Samples per Peak	Detection Mode	Internal Standard	Integration Type	Search Window	Integration Window	Regression Type
Low	1 Sc45	44.9559	150	44.844 - 45.068	44.956	EScan	0.150	0.300	0.0100	10	Counting		Average	60	80	Linear
	2 Y89	88.9059	150	88.684 - 89.128	88.906	EScan	0.150	0.300	0.0100	10	Counting		Average	60	80	Linear
	3 La139	138.9064	150	138.559 - 139.254	138.906	EScan	0.150	0.300	0.0100	10	Counting		Average	60	80	Linear
	4 Ce140	139.9054	150	139.556 - 140.255	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	5 Pr141	140.9077	150	140.555 - 141.260	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	6 Nd143	142.9098	150	142.553 - 143.267	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	7 Nd146	145.9131	150	145.548 - 146.278	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	8 Sm147	146.9149	150	146.548 - 147.282	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	9 Sm149	148.9172	150	148.545 - 149.289	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	10 Sm152	151.9197	150	151.540 - 152.300	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	11 Eu151	150.9199	150	150.543 - 151.297	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	12 Eu153	152.9212	150	152.539 - 153.304	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	13 Gd157	156.9240	150	156.532 - 157.316	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	14 Gd158	157.9241	150	157.529 - 158.319	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	15 Tb159	158.9254	150	158.528 - 159.323	138.906	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	16 Dy159	160.9269	150	160.525 - 161.329	160.927	EScan	0.150	0.300	0.0100	10	Counting		Average	60	80	Linear
	17 Dy163	162.9287	150	162.521 - 163.336	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	18 Dy164	163.9292	150	163.519 - 164.339	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	19 Ho165	164.9303	150	164.518 - 165.343	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	20 Er166	165.9303	150	165.515 - 166.345	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	21 Er167	166.9321	150	166.515 - 167.349	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	22 Tm169	168.9342	150	168.512 - 169.357	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	23 Yb172	171.9364	150	171.507 - 172.366	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	24 Yb173	172.9382	150	172.506 - 173.371	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	25 Yb174	173.9389	150	173.504 - 174.374	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	26 Lu175	174.9408	150	174.503 - 175.378	160.927	EScan	0.150	0.001	0.0100	10	Counting		Average	60	80	Linear
	27 Th232	232.0381	150	231.458 - 232.618	232.038	EScan	0.150	0.300	0.0100	10	Counting		Average	60	80	Linear

VEDLEGG B

Måldata, standarder

Sc45(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	4420.4 cps Data File	setSTDABC001.dat
Std.Dev.	185.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	3801.7 cps Data File	setSTDABC002.dat
Std.Dev.	553.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	3871.7 cps Data File	setSTDABC003.dat
Std.Dev.	298.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	5717.5 cps Data File	setSTDABC004.dat
Std.Dev.	971.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	7494.3 cps Data File	setSTDABC005.dat
Std.Dev.	384.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	23936.1 cps Data File	setSTDABC006.dat
Std.Dev.	884.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	44704.7 cps Data File	setSTDABC007.dat
Std.Dev.	341.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	226523.3 cps Data File	setSTDABC008.dat
Std.Dev.	4709.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	445451.7 cps Data File	setSTDABC009.dat
Std.Dev.	5360.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 44.30 * x + 3094.89$	Corr. Coeff.	0.99996
B : Thru Zero	$y = 44.71 * x$		
C : Weighted	$y = 41.99 * x + 3821.72$	Corr. Coeff.	0.99986
D : Square Fit	$y = -0.00 * x^2 + 44.63 * x + 2977.98$		

Y89(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	112.5 cps Data File	setSTDABC001.dat
Std.Dev.	18.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	188.3 cps Data File	setSTDABC002.dat
Std.Dev.	60.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	840.0 cps Data File	setSTDABC003.dat
Std.Dev.	39.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	3598.3 cps Data File	setSTDABC004.dat
Std.Dev.	88.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	6865.9 cps Data File	setSTDABC005.dat
Std.Dev.	97.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	32179.4 cps Data File	setSTDABC006.dat
Std.Dev.	1046.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	65222.9 cps Data File	setSTDABC007.dat
Std.Dev.	626.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	321715.3 cps Data File	setSTDABC008.dat
Std.Dev.	2484.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	637635.3 cps Data File	setSTDABC009.dat
Std.Dev.	7428.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 63.82 * x + 567.57$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 63.89 * x$		
C : Weighted	$y = 64.90 * x + 140.74$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 64.87 * x + 196.23$		

La139(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	220.0 cps Data File	setSTDABC001.dat
Std.Dev.	34.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	229.2 cps Data File	setSTDABC002.dat
Std.Dev.	35.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	1069.2 cps Data File	setSTDABC003.dat
Std.Dev.	37.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	4482.5 cps Data File	setSTDABC004.dat
Std.Dev.	91.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	9266.4 cps Data File	setSTDABC005.dat
Std.Dev.	392.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	40667.7 cps Data File	setSTDABC006.dat
Std.Dev.	915.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	82379.3 cps Data File	setSTDABC007.dat
Std.Dev.	298.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	399831.8 cps Data File	setSTDABC008.dat
Std.Dev.	16349.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	786696.7 cps Data File	setSTDABC009.dat
Std.Dev.	10198.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 78.78 * x + 1359.97$	Corr. Coeff.	0.99997
B : Thru Zero	$y = 78.96 * x$		
C : Weighted	$y = 81.99 * x + 214.71$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 81.23 * x + 500.69$		

Ce140(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	300.8 cps Data File	setSTDABC001.dat
Std.Dev.	43.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	251.7 cps Data File	setSTDABC002.dat
Std.Dev.	21.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	1092.5 cps Data File	setSTDABC003.dat
Std.Dev.	111.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	4465.0 cps Data File	setSTDABC004.dat
Std.Dev.	189.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	9078.8 cps Data File	setSTDABC005.dat
Std.Dev.	311.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	37688.3 cps Data File	setSTDABC006.dat
Std.Dev.	1390.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	77132.3 cps Data File	setSTDABC007.dat
Std.Dev.	631.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	365526.0 cps Data File	setSTDABC008.dat
Std.Dev.	17149.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	734536.0 cps Data File	setSTDABC009.dat
Std.Dev.	19701.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 73.29 * x + 1004.61$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 73.42 * x$		
C : Weighted	$y = 77.02 * x + 211.00$	Corr. Coeff.	1.00000
D : Square Fit	$y = 0.00 * x^2 + 72.89 * x + 1143.22$		

Pr141(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	29.2 cps Data File	setSTDABC001.dat
Std.Dev.	16.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	113.3 cps Data File	setSTDABC002.dat
Std.Dev.	21.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	951.7 cps Data File	setSTDABC003.dat
Std.Dev.	23.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	4775.0 cps Data File	setSTDABC004.dat
Std.Dev.	152.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	9378.0 cps Data File	setSTDABC005.dat
Std.Dev.	251.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	45549.1 cps Data File	setSTDABC006.dat
Std.Dev.	1417.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	92076.2 cps Data File	setSTDABC007.dat
Std.Dev.	1413.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	453415.3 cps Data File	setSTDABC008.dat
Std.Dev.	11274.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	901073.0 cps Data File	setSTDABC009.dat
Std.Dev.	6818.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 90.16 * x + 571.12$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 90.24 * x$		
C : Weighted	$y = 90.85 * x + 32.30$	Corr. Coeff.	1.00000
-- D : Square Fit	$y = -0.00 * x^2 + 91.30 * x + 172.45$		

Nd143(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	16.7 cps Data File	setSTDABC001.dat
Std.Dev.	3.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	25.8 cps Data File	setSTDABC002.dat
Std.Dev.	16.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	148.3 cps Data File	setSTDABC003.dat
Std.Dev.	24.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	638.3 cps Data File	setSTDABC004.dat
Std.Dev.	62.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	1189.2 cps Data File	setSTDABC005.dat
Std.Dev.	73.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	5541.7 cps Data File	setSTDABC006.dat
Std.Dev.	97.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	11240.7 cps Data File	setSTDABC007.dat
Std.Dev.	106.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	56138.9 cps Data File	setSTDABC008.dat
Std.Dev.	1816.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	109617.8 cps Data File	setSTDABC009.dat
Std.Dev.	1599.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 11.00 * x + 147.46$	Corr. Coeff.	0.99994
B : Thru Zero	$y = 11.02 * x$		
C : Weighted	$y = 11.14 * x + 17.40$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 11.46 * x - 16.17$		

Nd146(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	26.0 cps Data File	setSTDABC001.dat
Std.Dev.	11.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	25.6 cps Data File	setSTDABC002.dat
Std.Dev.	13.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	198.3 cps Data File	setSTDABC003.dat
Std.Dev.	41.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	820.8 cps Data File	setSTDABC004.dat
Std.Dev.	46.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	1730.8 cps Data File	setSTDABC005.dat
Std.Dev.	125.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	7745.3 cps Data File	setSTDABC006.dat
Std.Dev.	151.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	15986.9 cps Data File	setSTDABC007.dat
- Std.Dev.	177.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	79920.1 cps Data File	setSTDABC008.dat
Std.Dev.	2297.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	157246.2 cps Data File	setSTDABC009.dat
Std.Dev.	2015.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 15.76 * x + 121.63$	Corr. Coeff.	0.99997
B : Thru Zero	$y = 15.78 * x$		
C : Weighted	$y = 15.82 * x + 20.74$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 16.21 * x - 36.09$		

Sm147(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	6.7 cps Data File	setSTDABC001.dat
Std.Dev.	7.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	20.8 cps Data File	setSTDABC002.dat
- Std.Dev.	16.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	168.3 cps Data File	setSTDABC003.dat
Std.Dev.	25.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	708.3 cps Data File	setSTDABC004.dat
Std.Dev.	81.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	1392.5 cps Data File	setSTDABC005.dat
Std.Dev.	56.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	6954.3 cps Data File	setSTDABC006.dat
Std.Dev.	30.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	13763.3 cps Data File	setSTDABC007.dat
Std.Dev.	240.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	69869.4 cps Data File	setSTDABC008.dat
- Std.Dev.	1983.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	137860.2 cps Data File	setSTDABC009.dat
Std.Dev.	3406.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 13.81 * x + 63.79$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 13.82 * x$		
C : Weighted	$y = 13.88 * x + 8.36$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 14.13 * x - 46.45$		

Sm149(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	4.0 cps Data File	setSTDABC001.dat
Std.Dev.	3.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	19.4 cps Data File	setSTDABC002.dat
Std.Dev.	9.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	111.7 cps Data File	setSTDABC003.dat
- Std.Dev.	31.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	626.7 cps Data File	setSTDABC004.dat
Std.Dev.	8.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	1280.8 cps Data File	setSTDABC005.dat
Std.Dev.	31.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	6347.5 cps Data File	setSTDABC006.dat
Std.Dev.	174.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	12770.7 cps Data File	setSTDABC007.dat
Std.Dev.	158.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

- 8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	63136.0 cps Data File	setSTDABC008.dat
- Std.Dev.	2240.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	125696.2 cps Data File	setSTDABC009.dat
- Std.Dev.	1587.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 12.58 * x + 51.40$	Corr. Coeff.	1.00000
B : Thru Zero	$y = 12.58 * x$		
C : Weighted	$y = 12.62 * x + 3.02$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 12.69 * x + 10.30$		

Sm152(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	25.0 cps Data File	setSTDABC001.dat
Std.Dev.	4.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	40.8 cps Data File	setSTDABC002.dat
Std.Dev.	12.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	281.7 cps Data File	setSTDABC003.dat
Std.Dev.	26.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1191.7 cps Data File	setSTDABC004.dat
-- Std.Dev.	14.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2388.3 cps Data File	setSTDABC005.dat
Std.Dev.	61.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	12285.7 cps Data File	setSTDABC006.dat
Std.Dev.	180.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	24730.4 cps Data File	setSTDABC007.dat
Std.Dev.	185.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	122316.6 cps Data File	setSTDABC008.dat
Std.Dev.	1298.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	241607.2 cps Data File	setSTDABC009.dat
Std.Dev.	1717.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 24.20 * x + 182.18$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 24.23 * x$		
• C : Weighted	$y = 24.29 * x + 21.04$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 24.77 * x - 17.38$		

Eu151(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	13.6 cps Data File	setSTDABC001.dat
Std.Dev.	3.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	48.3 cps Data File	setSTDABC002.dat
Std.Dev.	7.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	454.2 cps Data File	setSTDABC003.dat
Std.Dev.	41.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	2145.0 cps Data File	setSTDABC004.dat
Std.Dev.	50.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	4365.8 cps Data File	setSTDABC005.dat
Std.Dev.	99.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	21396.6 cps Data File	setSTDABC006.dat
Std.Dev.	68.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	43334.6 cps Data File	setSTDABC007.dat
Std.Dev.	728.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	216556.1 cps Data File	setSTDABC008.dat
Std.Dev.	2887.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	426974.8 cps Data File	setSTDABC009.dat
Std.Dev.	3592.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 42.79 * x + 263.63$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 42.82 * x$		
• C : Weighted	$y = 42.81 * x + 12.14$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 43.88 * x - 120.84$		

Eu153(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
- Intensity	27.5 cps Data File	setSTDABC001.dat
Std.Dev.	11.5 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	70.0 cps Data File	setSTDABC002.dat
Std.Dev.	2.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	510.0 cps Data File	setSTDABC003.dat
Std.Dev.	38.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	2390.8 cps Data File	setSTDABC004.dat
Std.Dev.	158.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	4573.3 cps Data File	setSTDABC005.dat
Std.Dev.	91.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	23631.0 cps Data File	setSTDABC006.dat
Std.Dev.	456.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	47150.9 cps Data File	setSTDABC007.dat
Std.Dev.	654.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	234276.5 cps Data File	setSTDABC008.dat
Std.Dev.	4693.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	459045.2 cps Data File	setSTDABC009.dat
Std.Dev.	8091.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 46.04 * x + 516.63$	Corr. Coeff.	0.99996
B : Thru Zero	$y = 46.11 * x$		
C : Weighted	$y = 46.61 * x + 23.61$	Corr. Coeff.	1.00000
- D : Square Fit	$y = -0.00 * x^2 + 47.77 * x - 92.36$		

Gd157(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	7.1 cps Data File	setSTDABC001.dat
Std.Dev.	4.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
- Intensity	18.3 cps Data File	setSTDABC002.dat
Std.Dev.	1.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	190.8 cps Data File	setSTDABC003.dat
Std.Dev.	19.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	799.2 cps Data File	setSTDABC004.dat
Std.Dev.	80.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	1620.8 cps Data File	setSTDABC005.dat
Std.Dev.	25.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	7529.4 cps Data File	setSTDABC006.dat
Std.Dev.	395.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	14905.1 cps Data File	setSTDABC007.dat
Std.Dev.	75.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	76725.5 cps Data File	setSTDABC008.dat
Std.Dev.	512.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	152876.6 cps Data File	setSTDABC009.dat
Std.Dev.	1866.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 15.30 * x - 24.67$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 15.30 * x$		
C : Weighted	$y = 15.13 * x + 4.06$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 15.35 * x - 42.52$		

Gd158(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	5.8 cps Data File	setSTDABC001.dat
Std.Dev.	5.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	29.2 cps Data File	setSTDABC002.dat
Std.Dev.	21.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
- Intensity	253.3 cps Data File	setSTDABC003.dat
Std.Dev.	51.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1006.7 cps Data File	setSTDABC004.dat
Std.Dev.	20.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2016.7 cps Data File	setSTDABC005.dat
Std.Dev.	101.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	10146.4 cps Data File	setSTDABC006.dat
Std.Dev.	228.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	20379.8 cps Data File	setSTDABC007.dat
Std.Dev.	485.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	99360.3 cps Data File	setSTDABC008.dat
Std.Dev.	2412.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	199997.8 cps Data File	setSTDABC009.dat
Std.Dev.	2859.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 19.97 * x + 50.11$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 19.98 * x$		
C : Weighted	$y = 20.08 * x + 6.32$	Corr. Coeff.	1.00000
D : Square Fit	$y = 0.00 * x^2 + 19.79 * x + 114.54$		

Tb159(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	6.7 cps Data File	setSTDABC001.dat
Std.Dev.	7.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	70.0 cps Data File	setSTDABC002.dat
Std.Dev.	13.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	802.5 cps Data File	setSTDABC003.dat
Std.Dev.	39.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	3970.8 cps Data File	setSTDABC004.dat
Std.Dev.	236.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	7896.9 cps Data File	setSTDABC005.dat
Std.Dev.	391.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	38865.1 cps Data File	setSTDABC006.dat
Std.Dev.	810.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	80200.7 cps Data File	setSTDABC007.dat
Std.Dev.	1841.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	385507.0 cps Data File	setSTDABC008.dat
Std.Dev.	5955.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	767265.7 cps Data File	setSTDABC009.dat
Std.Dev.	4305.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 76.74 * x + 663.40$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 76.83 * x$		
C : Weighted	$y = 77.02 * x + 4.21$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 77.69 * x + 329.19$		

Dy161(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	4.9 cps Data File	setSTDABC001.dat
Std.Dev.	2.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	18.3 cps Data File	setSTDABC002.dat
Std.Dev.	1.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	200.0 cps Data File	setSTDABC003.dat
Std.Dev.	7.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1052.5 cps Data File	setSTDABC004.dat
Std.Dev.	83.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2093.3 cps Data File	setSTDABC005.dat
Std.Dev.	46.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	10279.0 cps Data File	setSTDABC006.dat
Std.Dev.	252.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	20540.7 cps Data File	setSTDABC007.dat
Std.Dev.	485.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	102913.2 cps Data File	setSTDABC008.dat
Std.Dev.	3422.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	202818.0 cps Data File	setSTDABC009.dat
Std.Dev.	2641.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 20.33 * x + 142.33$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 20.34 * x$		
-. C : Weighted	$y = 20.44 * x - 0.56$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 20.86 * x - 44.81$		

Dy163(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	3.6 cps Data File	setSTDABC001.dat
Std.Dev.	3.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	23.3 cps Data File	setSTDABC002.dat
Std.Dev.	18.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	235.8 cps Data File	setSTDABC003.dat
Std.Dev.	27.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1385.8 cps Data File	setSTDABC004.dat
Std.Dev.	33.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2613.3 cps Data File	setSTDABC005.dat
Std.Dev.	55.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	13292.4 cps Data File	setSTDABC006.dat
Std.Dev.	75.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	26965.5 cps Data File	setSTDABC007.dat
Std.Dev.	215.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	136243.4 cps Data File	setSTDABC008.dat
Std.Dev.	1531.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	268094.7 cps Data File	setSTDABC009.dat
Std.Dev.	1005.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 26.88 * x + 106.44$	Corr. Coeff.	0.99997
B : Thru Zero	$y = 26.90 * x$		
C : Weighted	$y = 26.79 * x + 2.96$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 27.64 * x - 160.55$		

Dy164(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	5.8 cps Data File	setSTDABC001.dat
Std.Dev.	6.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	34.2 cps Data File	setSTDABC002.dat
Std.Dev.	7.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	341.7 cps Data File	setSTDABC003.dat
Std.Dev.	42.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1715.8 cps Data File	setSTDABC004.dat
Std.Dev.	103.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	3231.7 cps Data File	setSTDABC005.dat
Std.Dev.	247.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	16020.3 cps Data File	setSTDABC006.dat
Std.Dev.	86.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	32307.7 cps Data File	setSTDABC007.dat
Std.Dev.	833.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	162755.1 cps Data File	setSTDABC008.dat
Std.Dev.	624.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	320019.8 cps Data File	setSTDABC009.dat
Std.Dev.	2172.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 32.09 * x + 204.82$	Corr. Coeff.	0.99997
B : Thru Zero	$y = 32.11 * x$		
C : Weighted	$y = 32.31 * x + 4.14$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 33.04 * x - 129.45$		

Ho165(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	5.0 cps Data File	setSTDABC001.dat
Std.Dev.	2.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	123.3 cps Data File	setSTDABC002.dat
Std.Dev.	25.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	1097.5 cps Data File	setSTDABC003.dat
Std.Dev.	32.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	5485.8 cps Data File	setSTDABC004.dat
Std.Dev.	154.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	10698.9 cps Data File	setSTDABC005.dat
Std.Dev.	301.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	54140.5 cps Data File	setSTDABC006.dat
Std.Dev.	191.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	108455.2 cps Data File	setSTDABC007.dat
Std.Dev.	1204.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	536977.5 cps Data File	setSTDABC008.dat
Std.Dev.	6570.0 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	1058424.7 cps Data File	setSTDABC009.dat
Std.Dev.	3626.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 106.05 * x + 943.29$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 106.18 * x$		
C : Weighted	$y = 107.10 * x + 5.36$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 108.94 * x - 70.50$		

Er166(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	1.8 cps Data File	setSTDABC001.dat
Std.Dev.	1.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	38.3 cps Data File	setSTDABC002.dat
Std.Dev.	5.2 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	365.0 cps Data File	setSTDABC003.dat
Std.Dev.	49.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1757.5 cps Data File	setSTDABC004.dat
Std.Dev.	80.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	3500.0 cps Data File	setSTDABC005.dat
Std.Dev.	152.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	17856.3 cps Data File	setSTDABC006.dat
Std.Dev.	216.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	35523.9 cps Data File	setSTDABC007.dat
Std.Dev.	428.7 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	178885.3 cps Data File	setSTDABC008.dat
Std.Dev.	3331.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	354800.6 cps Data File	setSTDABC009.dat
Std.Dev.	3074.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 35.53 * x + 88.65$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 35.54 * x$		
C : Weighted	$y = 35.55 * x + 1.86$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 36.04 * x - 91.43$		

Er167(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	1.0 cps Data File	setSTDABC001.dat
Std.Dev.	1.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	28.3 cps Data File	setSTDABC002.dat
Std.Dev.	8.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	226.7 cps Data File	setSTDABC003.dat
Std.Dev.	12.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1198.3 cps Data File	setSTDABC004.dat
Std.Dev.	17.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2315.0 cps Data File	setSTDABC005.dat
Std.Dev.	50.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	11959.8 cps Data File	setSTDABC006.dat
Std.Dev.	246.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	23989.4 cps Data File	setSTDABC007.dat
Std.Dev.	359.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	120013.0 cps Data File	setSTDABC008.dat
Std.Dev.	1222.7 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	240585.3 cps Data File	setSTDABC009.dat
Std.Dev.	2581.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 24.05 * x - 47.48$	Corr. Coeff.	1.00000
- B : Thru Zero	$y = 24.05 * x$		
C : Weighted	$y = 23.93 * x + 0.77$	Corr. Coeff.	1.00000
D : Square Fit	$y = 0.00 * x^2 + 23.95 * x - 13.01$		

Tm169(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	3.3 cps Data File	setSTDABC001.dat
Std.Dev.	1.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	108.3 cps Data File	setSTDABC002.dat
Std.Dev.	11.3 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	1035.8 cps Data File	setSTDABC003.dat
Std.Dev.	29.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	5185.8 cps Data File	setSTDABC004.dat
Std.Dev.	219.9 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	10710.6 cps Data File	setSTDABC005.dat
Std.Dev.	423.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	53977.1 cps Data File	setSTDABC006.dat
Std.Dev.	705.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	108071.9 cps Data File	setSTDABC007.dat
Std.Dev.	1439.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	531610.7 cps Data File	setSTDABC008.dat
Std.Dev.	6608.5 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	1045147.0 cps Data File	setSTDABC009.dat
Std.Dev.	11164.1 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 104.75 * x + 1173.67$	Corr. Coeff.	0.99997
- B : Thru Zero	$y = 104.91 * x$		
C : Weighted	$y = 106.23 * x + 3.25$	Corr. Coeff.	1.00000

D : Square Fit $y = -0.00 * x^2 + 108.18 * x - 29.74$

Yb172(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	0.8 cps Data File	setSTDABC001.dat
Std.Dev.	1.4 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration	1.000 ppt Standard File	1ppt_set1.std
Intensity	18.8 cps Data File	setSTDABC002.dat
Std.Dev.	8.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration	10.000 ppt Standard File	10ppt_set1.std
Intensity	258.3 cps Data File	setSTDABC003.dat
Std.Dev.	18.1 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration	50.000 ppt Standard File	50ppt_set1.std
Intensity	1142.5 cps Data File	setSTDABC004.dat
Std.Dev.	36.8 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration	100.000 ppt Standard File	100ppt_set1.std
Intensity	2470.0 cps Data File	setSTDABC005.dat
Std.Dev.	91.9 cps Method File	set1.met

- Datapoint enabled in Regression Types : A B C D

6 Concentration	500.000 ppt Standard File	500ppt_set1.std
Intensity	11758.3 cps Data File	setSTDABC006.dat
Std.Dev.	557.6 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration	1000.000 ppt Standard File	1000ppt_set1.std
Intensity	23373.5 cps Data File	setSTDABC007.dat
Std.Dev.	659.2 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration	5000.000 ppt Standard File	5000ppt_set1.std
Intensity	118629.6 cps Data File	setSTDABC008.dat
Std.Dev.	3290.0 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration	10000.000 ppt Standard File	10000ppt_set1.std
Intensity	235061.1 cps Data File	setSTDABC009.dat
Std.Dev.	2198.9 cps Method File	set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 23.54 * x + 54.15$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 23.55 * x$		
- C : Weighted	$y = 23.54 * x + 0.77$	Corr. Coeff.	1.00000
- D : Square Fit	$y = -0.00 * x^2 + 23.90 * x - 70.99$		

Yb173(LR)

1 Concentration	0.000 ppt Standard File	0ppt_set1.std
Intensity	0.8 cps Data File	setSTDABC001.dat

Std.Dev. 1.4 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration 1.000 ppt Standard File 1ppt_set1.std
Intensity 14.2 cps Data File setSTDABC002.dat
Std.Dev. 10.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration 10.000 ppt Standard File 10ppt_set1.std
Intensity 187.5 cps Data File setSTDABC003.dat
Std.Dev. 45.6 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration 50.000 ppt Standard File 50ppt_set1.std
Intensity 930.8 cps Data File setSTDABC004.dat
Std.Dev. 17.7 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration 100.000 ppt Standard File 100ppt_set1.std
Intensity 1681.7 cps Data File setSTDABC005.dat
Std.Dev. 40.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration 500.000 ppt Standard File 500ppt_set1.std
Intensity 8698.8 cps Data File setSTDABC006.dat
Std.Dev. 84.7 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration 1000.000 ppt Standard File 1000ppt_set1.std
Intensity 17397.2 cps Data File setSTDABC007.dat
Std.Dev. 321.2 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration 5000.000 ppt Standard File 5000ppt_set1.std
Intensity 87078.2 cps Data File setSTDABC008.dat
Std.Dev. 1681.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration 10000.000 ppt Standard File 10000ppt_set1.std
Intensity 172695.8 cps Data File setSTDABC009.dat
Std.Dev. 517.5 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 17.29 * x + 66.71$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 17.30 * x$		
C : Weighted	$y = 17.30 * x + 1.14$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 17.55 * x - 24.23$		

Yb174(LR)

1 Concentration 0.000 ppt Standard File 0ppt_set1.std
Intensity 4.2 cps Data File setSTDABC001.dat
Std.Dev. 5.2 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration 1.000 ppt Standard File 1ppt_set1.std
Intensity 40.0 cps Data File setSTDABC002.dat

Std.Dev. 2.5 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration 10.000 ppt Standard File 10ppt_set1.std
Intensity 345.8 cps Data File setSTDABC003.dat
Std.Dev. 26.5 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration 50.000 ppt Standard File 50ppt_set1.std
Intensity 1715.8 cps Data File setSTDABC004.dat
Std.Dev. 77.3 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration 100.000 ppt Standard File 100ppt_set1.std
Intensity 3286.7 cps Data File setSTDABC005.dat
Std.Dev. 133.8 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration 500.000 ppt Standard File 500ppt_set1.std
Intensity 16848.8 cps Data File setSTDABC006.dat
Std.Dev. 322.5 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration 1000.000 ppt Standard File 1000ppt_set1.std
Intensity 33679.5 cps Data File setSTDABC007.dat
Std.Dev. 274.7 cps Method File set1.met

↵ Datapoint enabled in Regression Types : A B C D

8 Concentration 5000.000 ppt Standard File 5000ppt_set1.std
Intensity 168363.0 cps Data File setSTDABC008.dat
Std.Dev. 2757.4 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration 10000.000 ppt Standard File 10000ppt_set1.std
Intensity 333008.3 cps Data File setSTDABC009.dat
Std.Dev. 1137.8 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 33.36 * x + 173.16$	Corr. Coeff.	0.99999
B : Thru Zero	$y = 33.38 * x$		
C : Weighted	$y = 33.38 * x + 6.25$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 34.02 * x - 61.58$		

Lu175(LR)

1 Concentration 0.000 ppt Standard File 0ppt_set1.std
Intensity 9.2 cps Data File setSTDABC001.dat
Std.Dev. 5.2 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration 1.000 ppt Standard File 1ppt_set1.std
Intensity 84.2 cps Data File setSTDABC002.dat
Std.Dev. 30.9 cps Method File set1.met

↵ Datapoint enabled in Regression Types : A B C D

3 Concentration 10.000 ppt Standard File 10ppt_set1.std
Intensity 967.5 cps Data File setSTDABC003.dat

Std.Dev. 56.6 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration 50.000 ppt Standard File 50ppt_set1.std
Intensity 4908.3 cps Data File setSTDABC004.dat
Std.Dev. 114.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration 100.000 ppt Standard File 100ppt_set1.std
Intensity 9116.3 cps Data File setSTDABC005.dat
Std.Dev. 279.8 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration 500.000 ppt Standard File 500ppt_set1.std
Intensity 46360.9 cps Data File setSTDABC006.dat
Std.Dev. 335.5 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration 1000.000 ppt Standard File 1000ppt_set1.std
Intensity 93097.9 cps Data File setSTDABC007.dat
Std.Dev. 935.0 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration 5000.000 ppt Standard File 5000ppt_set1.std
Intensity 460457.8 cps Data File setSTDABC008.dat
Std.Dev. 13191.2 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration 10000.000 ppt Standard File 10000ppt_set1.std
Intensity 910086.3 cps Data File setSTDABC009.dat
Std.Dev. 7544.6 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 91.15 * x + 718.41$	Corr. Coeff.	0.99998
B : Thru Zero	$y = 91.24 * x$		
C : Weighted	$y = 92.39 * x + 9.54$	Corr. Coeff.	1.00000
D : Square Fit	$y = -0.00 * x^2 + 93.18 * x + 6.12$		

Th232(LR)

1 Concentration 0.000 ppt Standard File 0ppt_set1.std
Intensity 65.0 cps Data File setSTDABC001.dat
Std.Dev. 4.3 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

2 Concentration 1.000 ppt Standard File 1ppt_set1.std
Intensity 411.7 cps Data File setSTDABC002.dat
Std.Dev. 25.0 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

3 Concentration 10.000 ppt Standard File 10ppt_set1.std
Intensity 779.2 cps Data File setSTDABC003.dat
Std.Dev. 19.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

4 Concentration 50.000 ppt Standard File 50ppt_set1.std
Intensity 5265.8 cps Data File setSTDABC004.dat

Std.Dev. 220.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

5 Concentration 100.000 ppt Standard File 100ppt_set1.std
Intensity 41887.0 cps Data File setSTDABC005.dat
Std.Dev. 413.0 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

6 Concentration 500.000 ppt Standard File 500ppt_set1.std
Intensity 53832.9 cps Data File setSTDABC006.dat
Std.Dev. 1756.1 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

7 Concentration 1000.000 ppt Standard File 1000ppt_set1.std
Intensity 107228.9 cps Data File setSTDABC007.dat
Std.Dev. 2934.6 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

8 Concentration 5000.000 ppt Standard File 5000ppt_set1.std
Intensity 520724.7 cps Data File setSTDABC008.dat
Std.Dev. 20572.0 cps Method File set1.met

Datapoint enabled in Regression Types : A B C D

9 Concentration 10000.000 ppt Standard File 10000ppt_set1.std
Intensity 1226379.3 cps Data File setSTDABC009.dat
Std.Dev. 2940.0 cps Method File set1.met

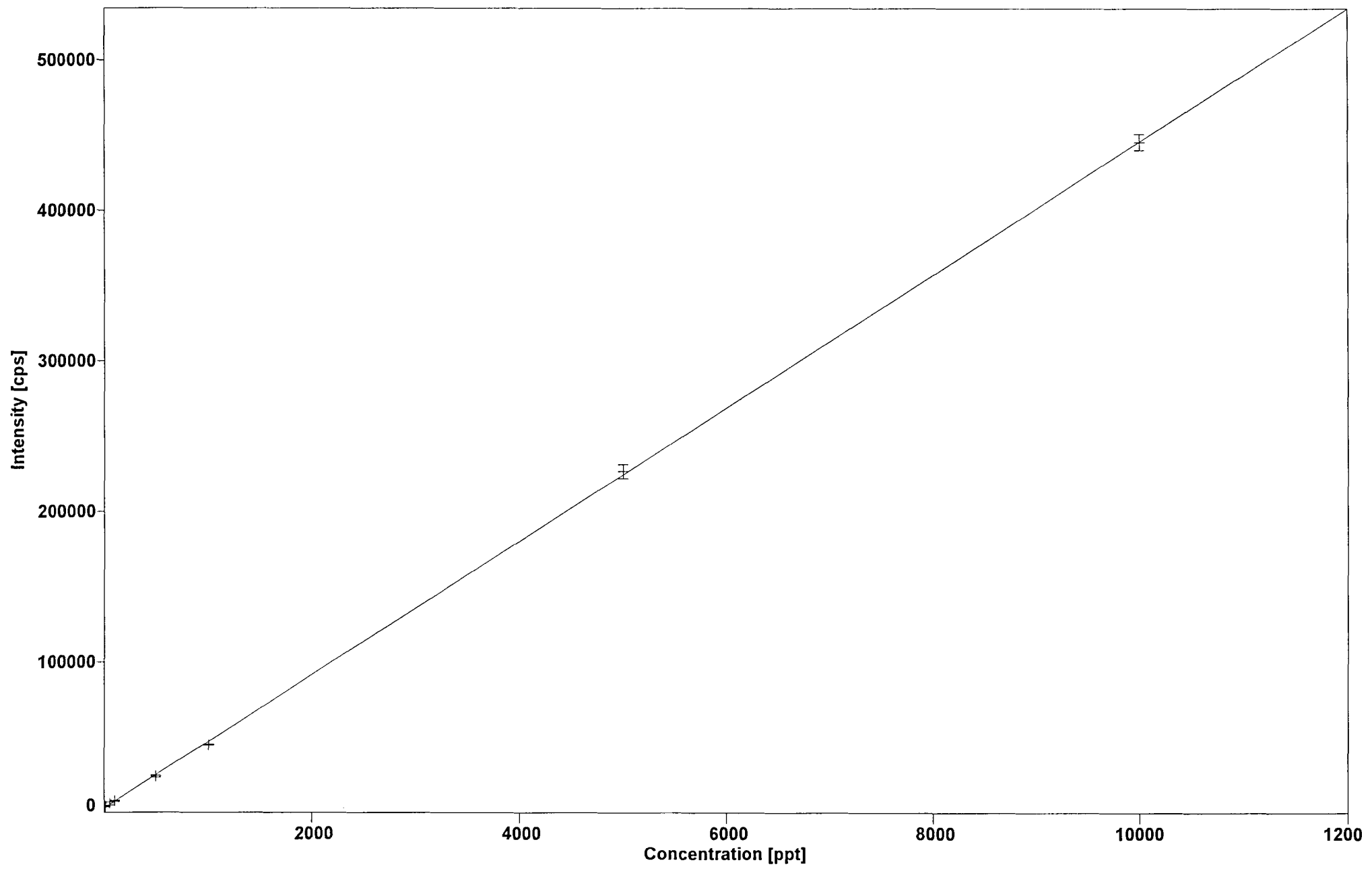
Datapoint enabled in Regression Types : A B C D

--> A : Linear	$y = 119.30 * x - 3462.08$	Corr. Coeff.	0.99713
← B : Thru Zero	$y = 118.85 * x$		
C : Weighted	$y = 122.55 * x + 49.48$	Corr. Coeff.	1.00000
D : Square Fit	$y = 0.00 * x^2 + 85.08 * x + 8555.76$		

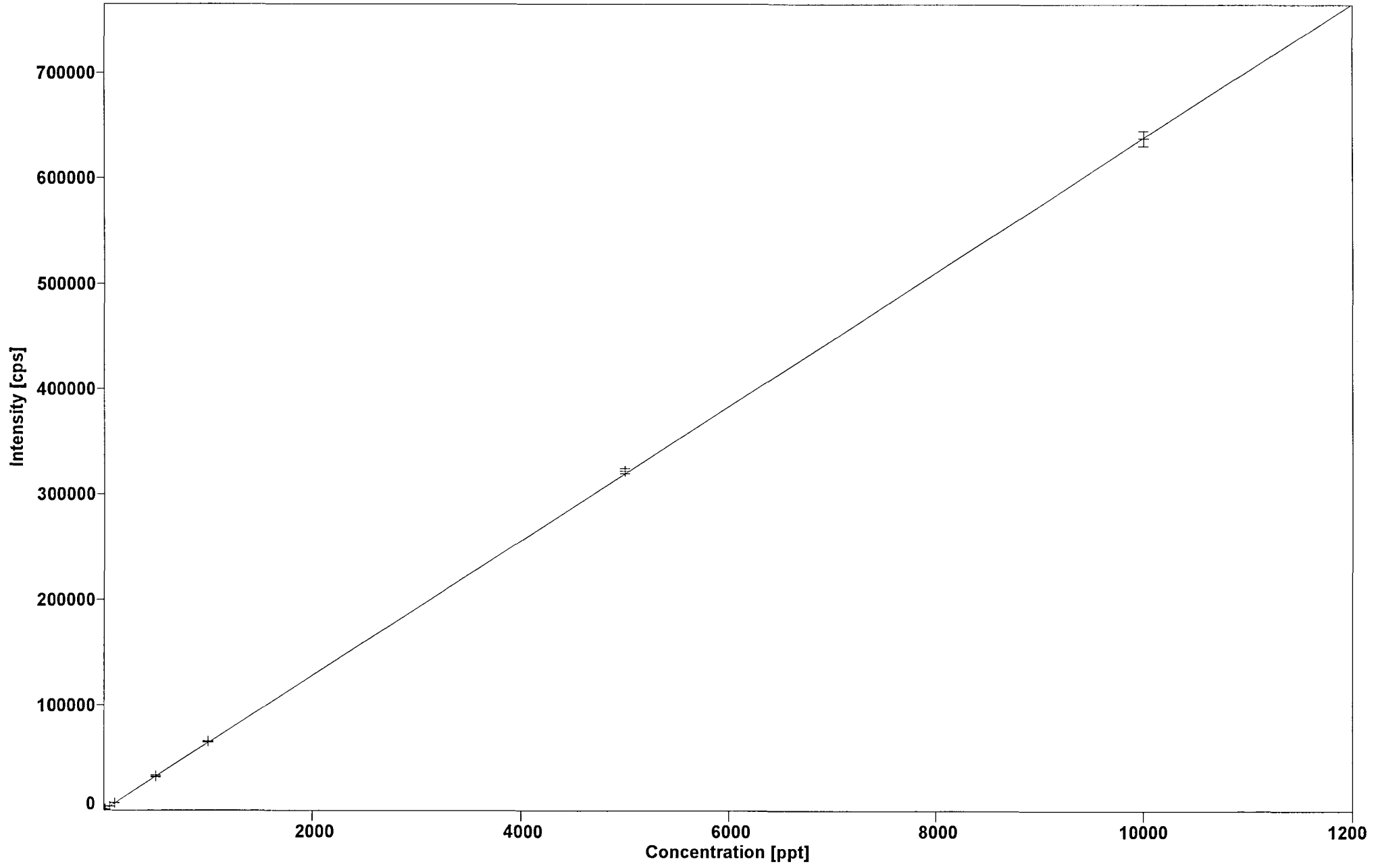
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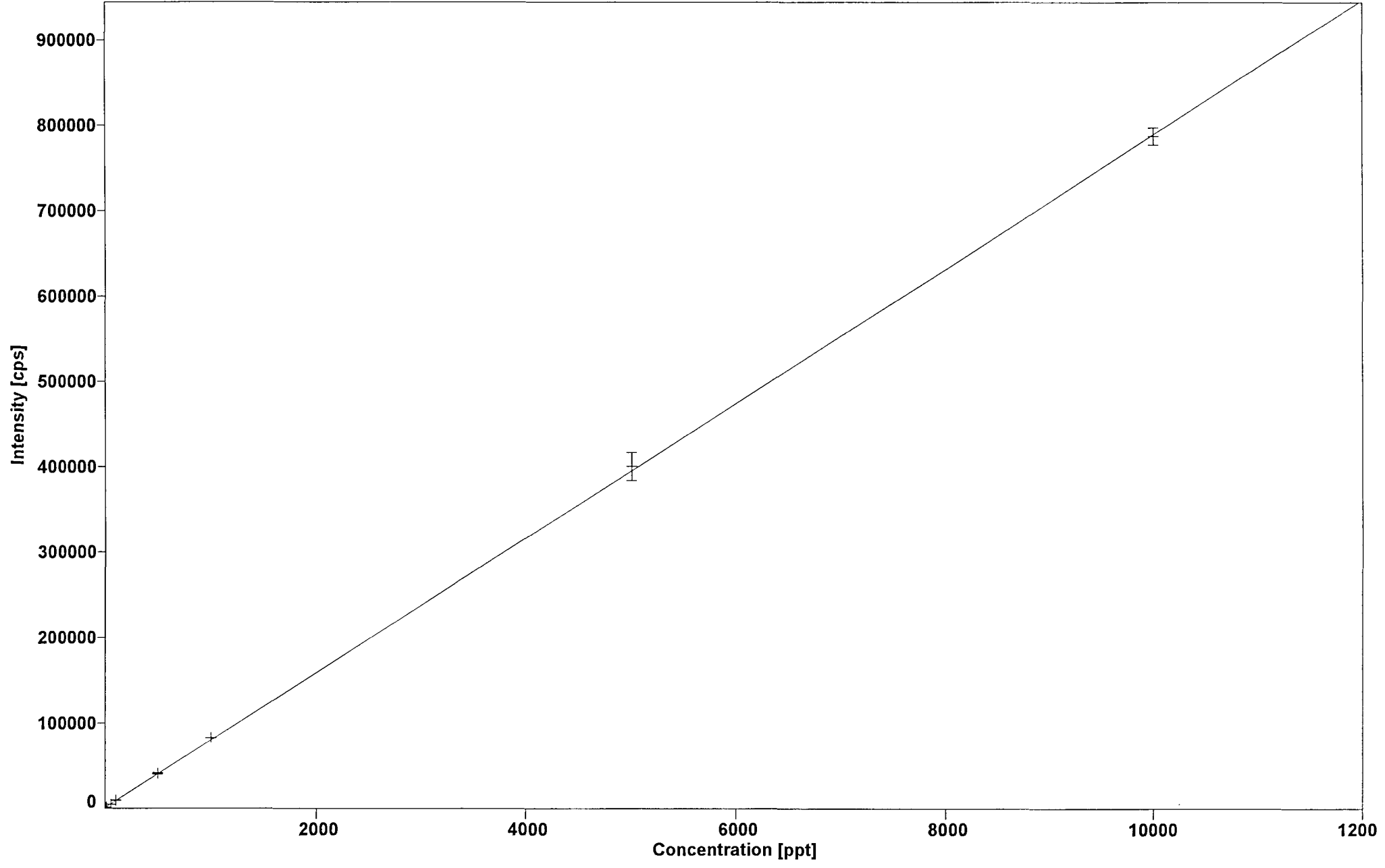
Sc45(LR) $y = 44.30 * x + 3094.89$ Corr. Coeff. : 0.99996 Repr. Type : Linear



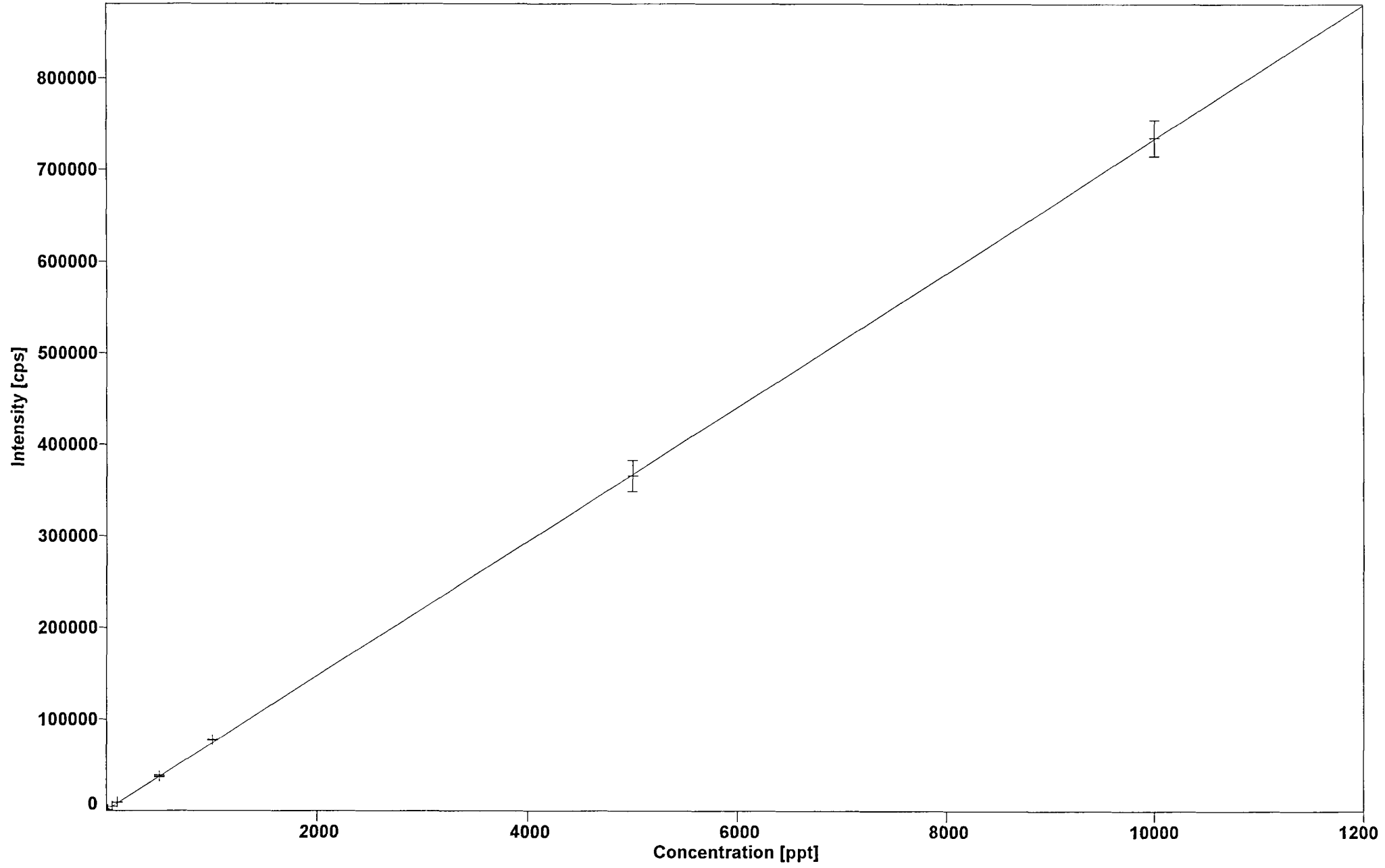
Y89(LR) $y = 63.82 * x + 567.57$ Corr. Coeff. : 0.99999 Repr. Type : Linear



La139(LR) $y = 78.78 * x + 1359.97$ Corr. Coeff. : 0.99997 Regr. Type : Linear

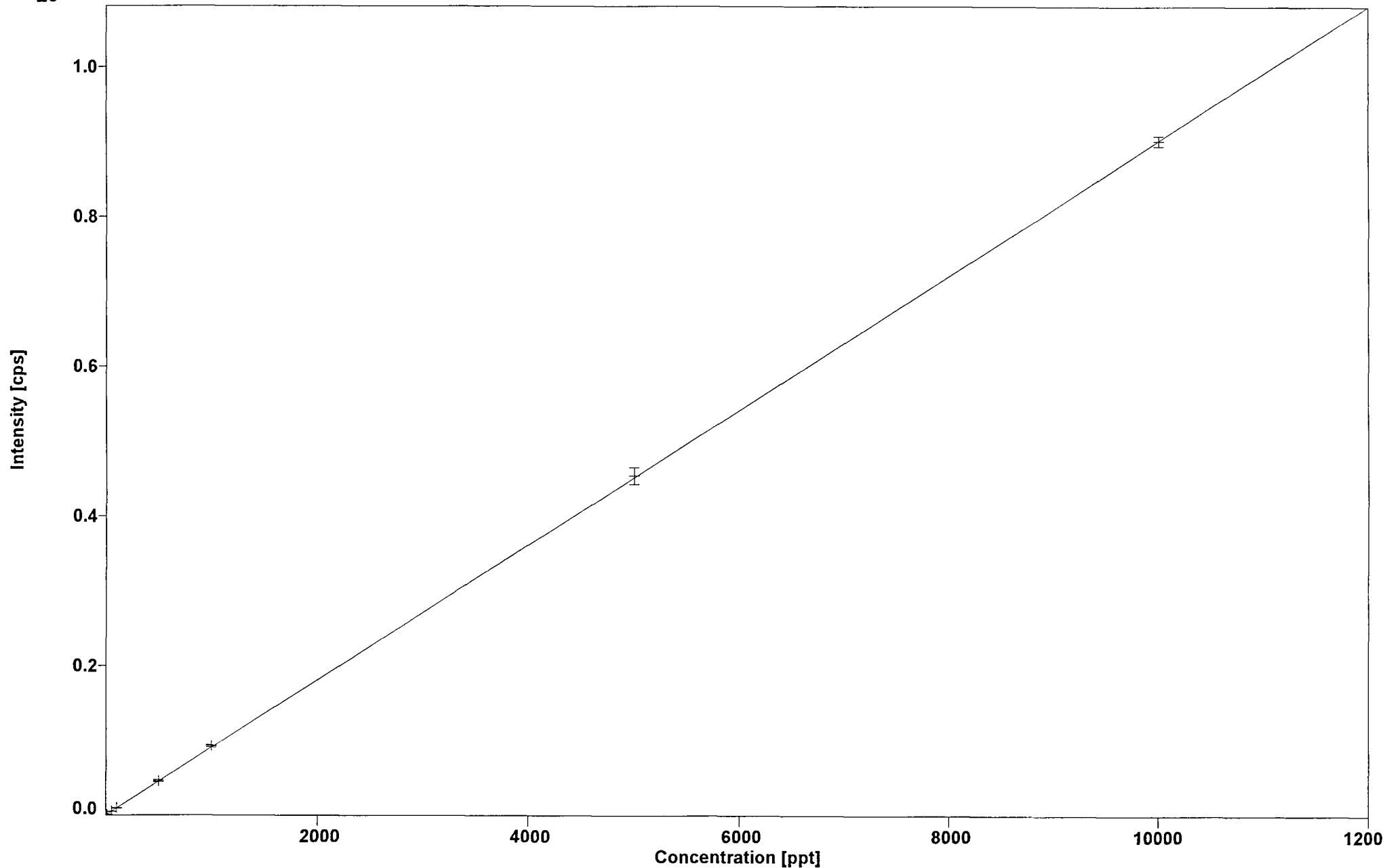


Ce140(LR) $y = 73.29 * x + 1004.61$ Corr. Coeff. : 0.99999 Regr. Type : Linear

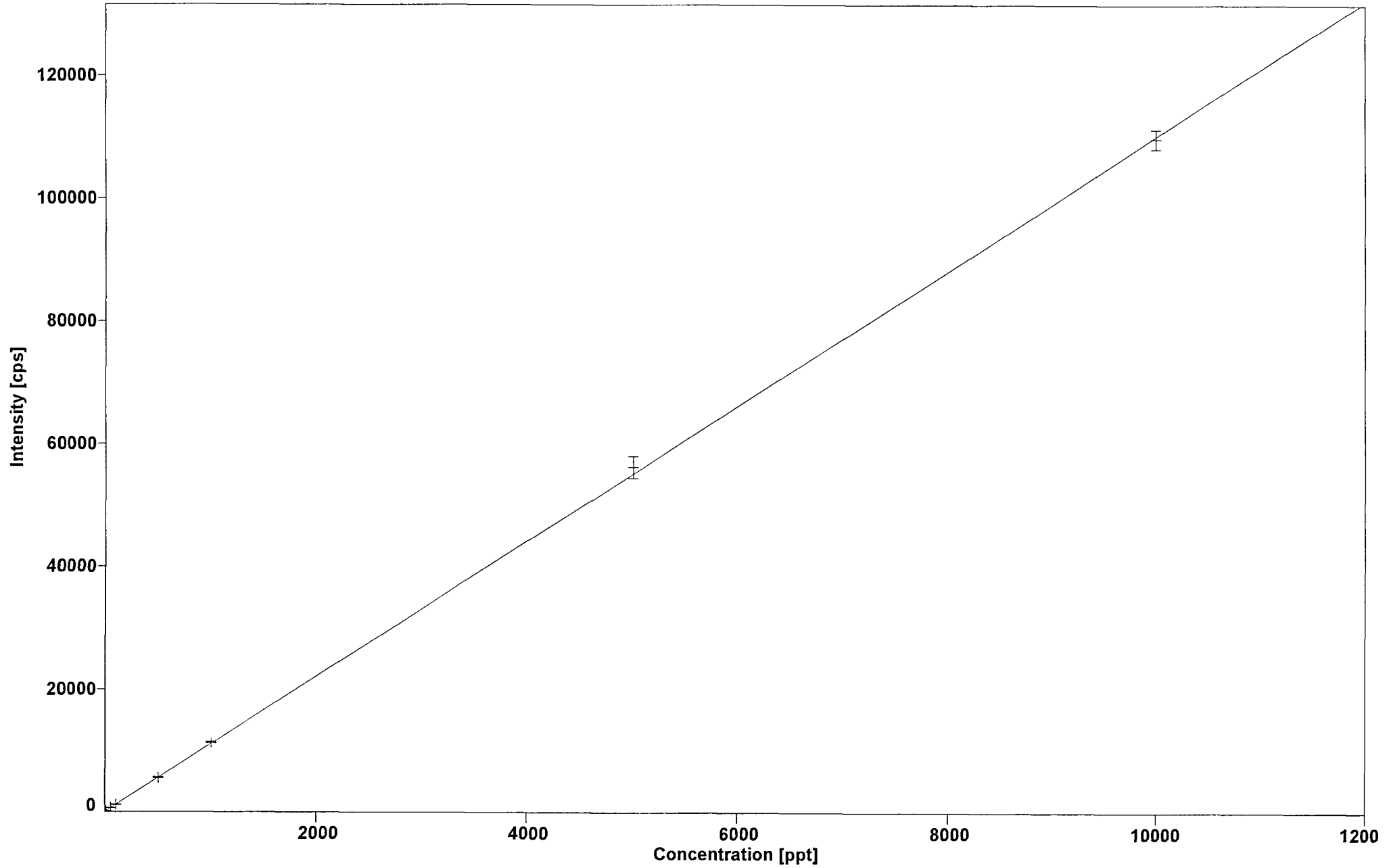


Pr141(LR) $y = 90.16 * x + 571.12$ Corr. Coeff. : 0.99999 Repr. Type : Linear

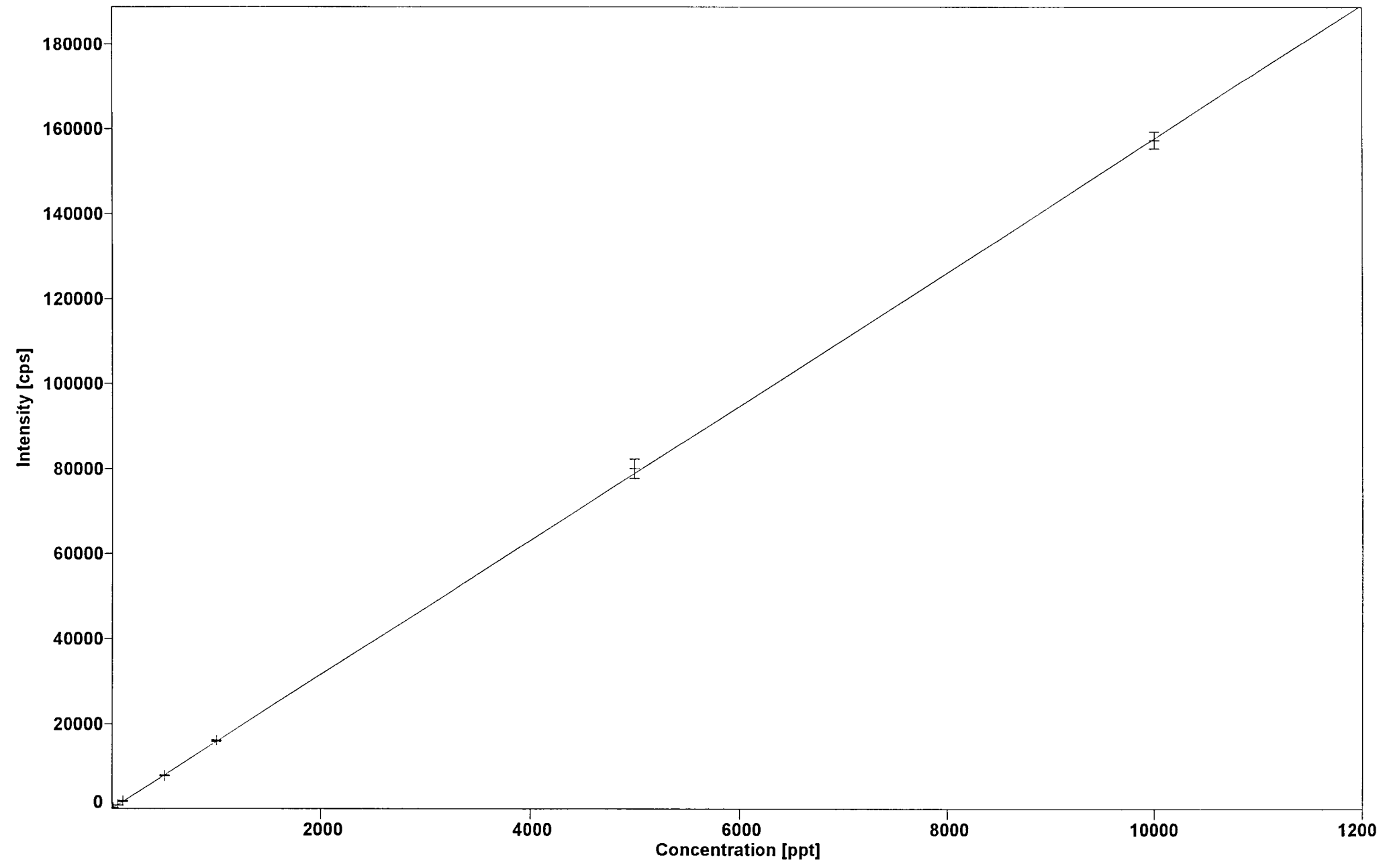
*E6



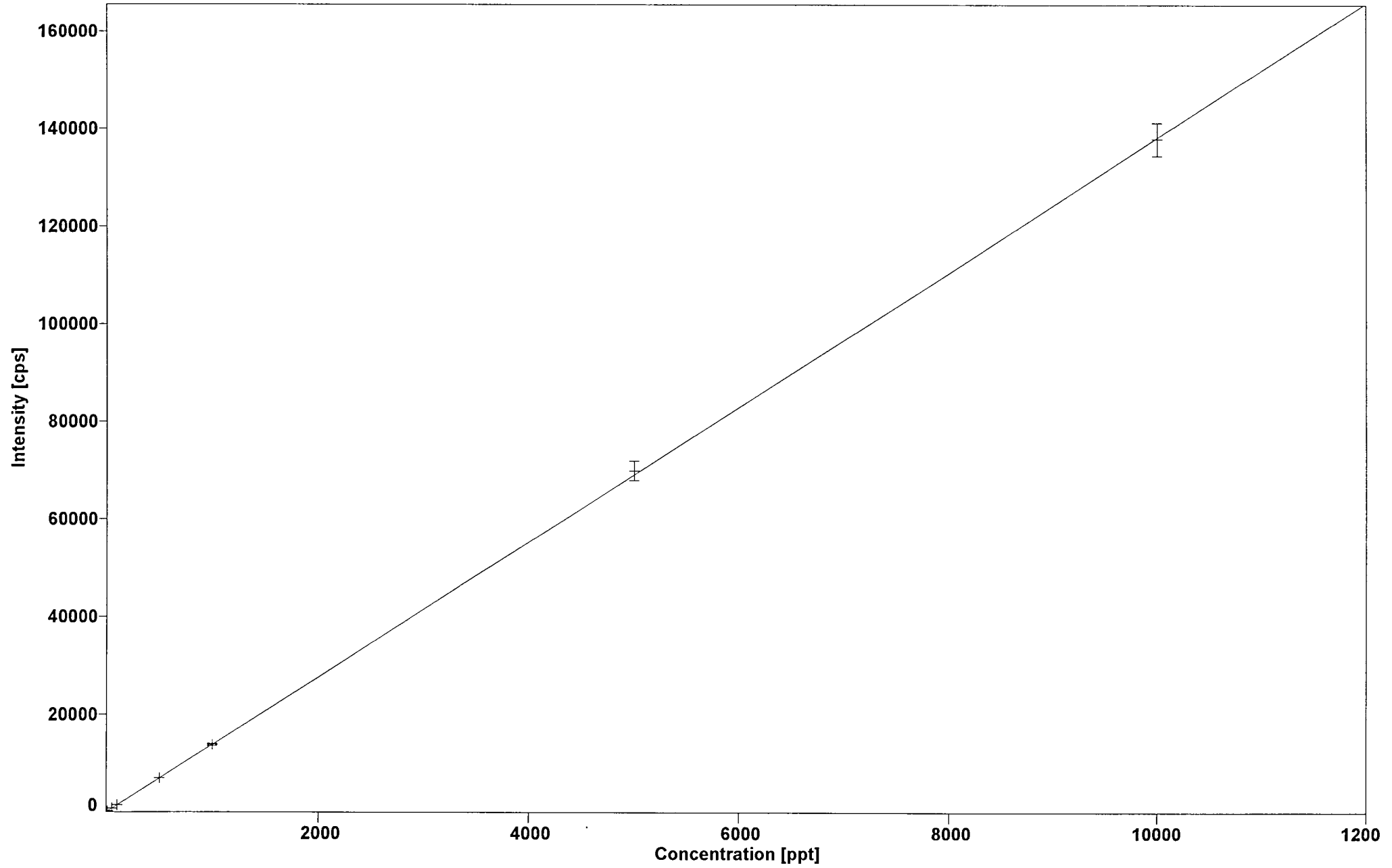
Nd143(LR) $y = 11.00 * x + 147.46$ Corr. Coeff. : 0.99994 Repr. Type : Linear



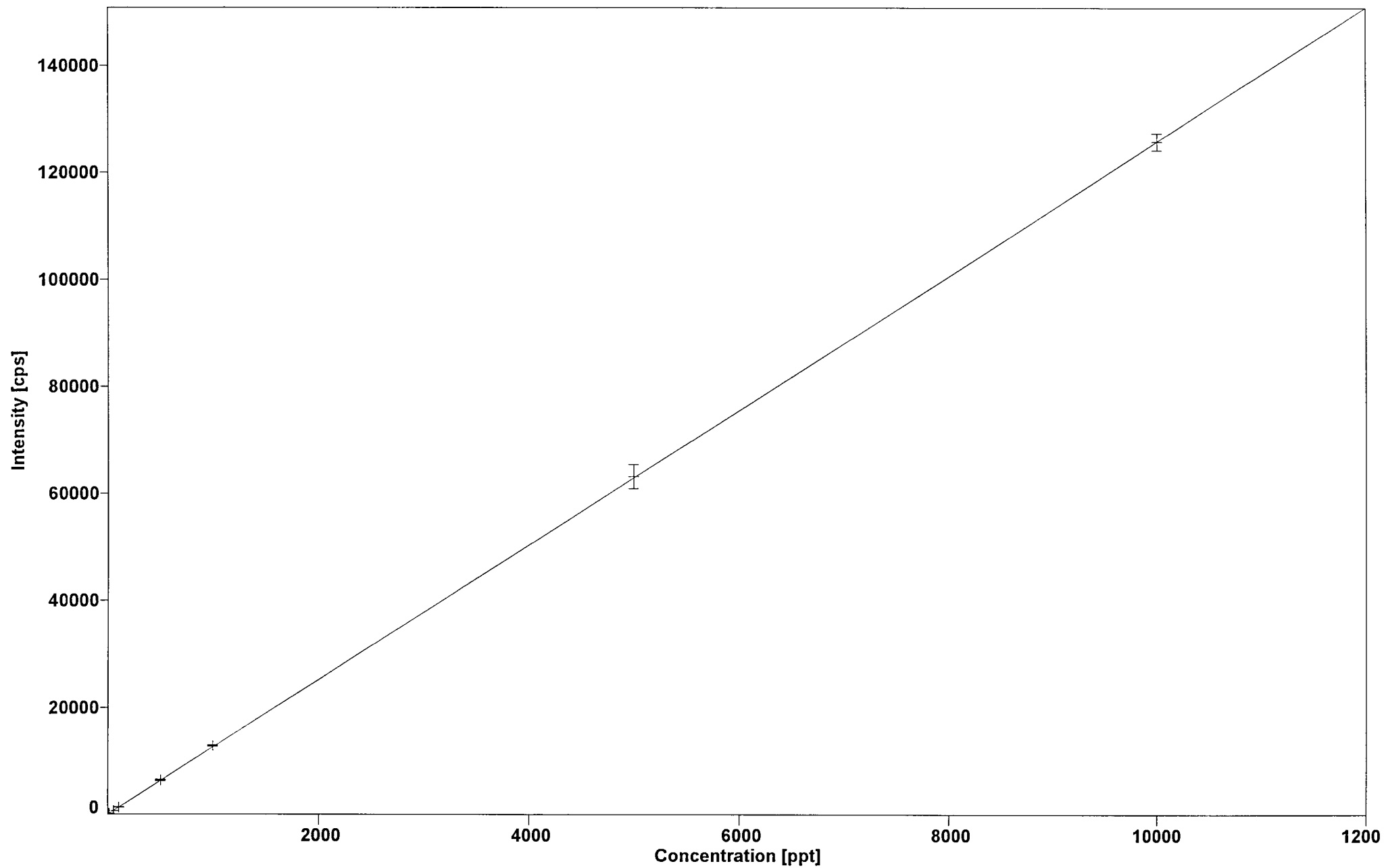
Nd146(LR) $y = 15.76 * x + 121.63$ Corr. Coeff. : 0.99997 Regr. Type : Linear



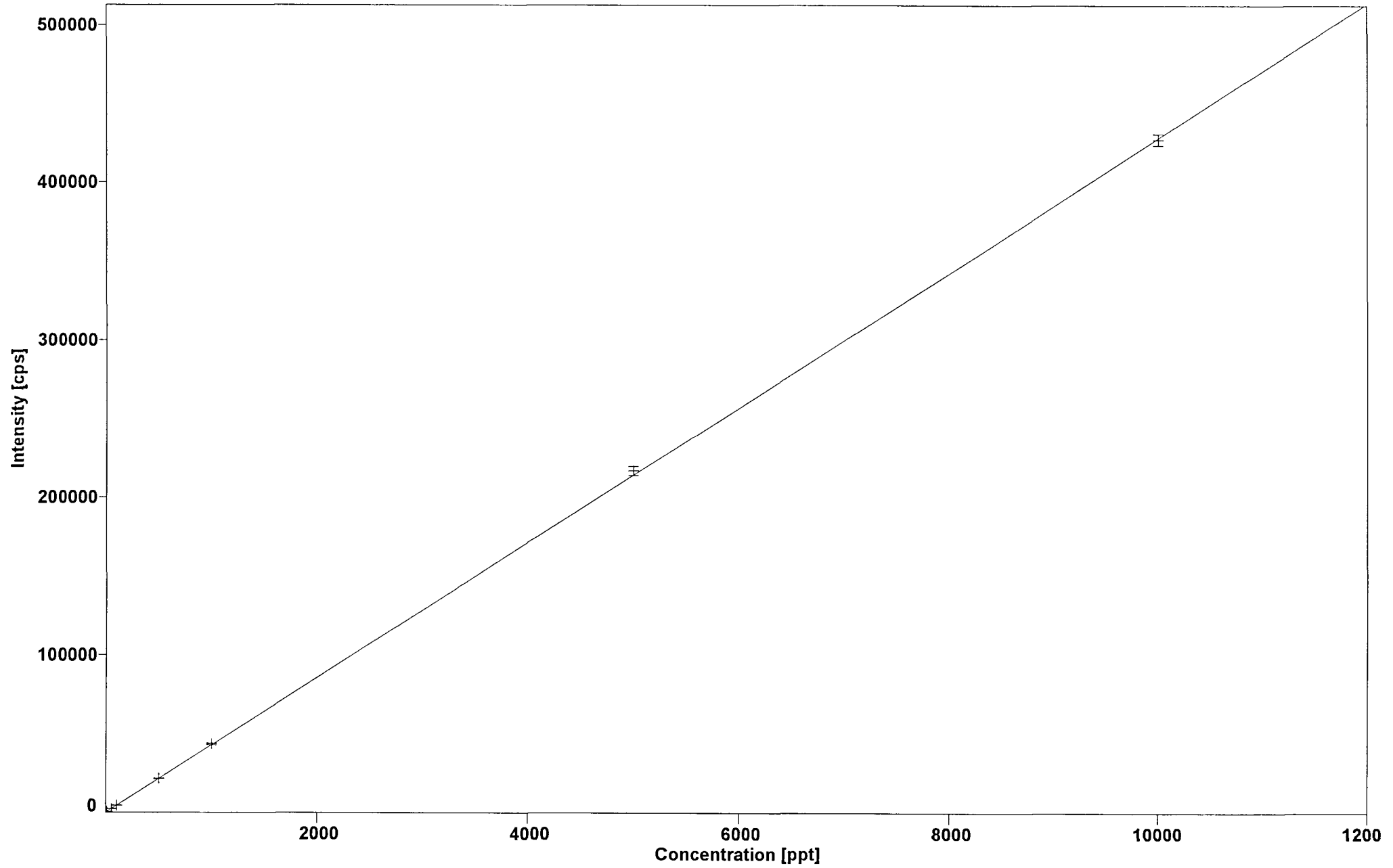
Sm147(LR) $y = 13.81 * x + 63.79$ Corr. Coeff. : 0.99998 Repr. Type : Linear



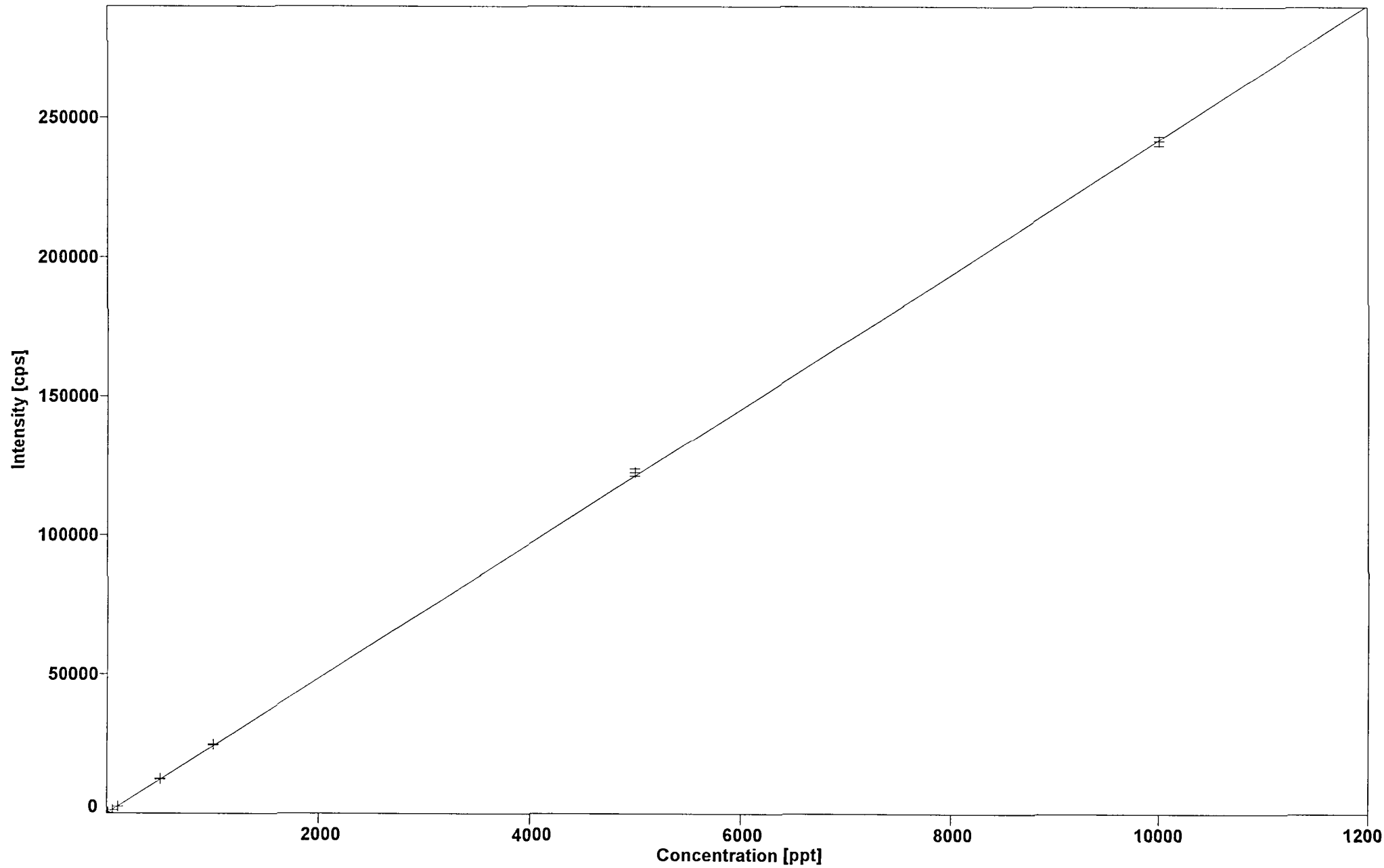
Sm149(LR) $y = 12.58 * x + 51.40$ Corr. Coeff. : 1.00000 Repr. Type : Linear



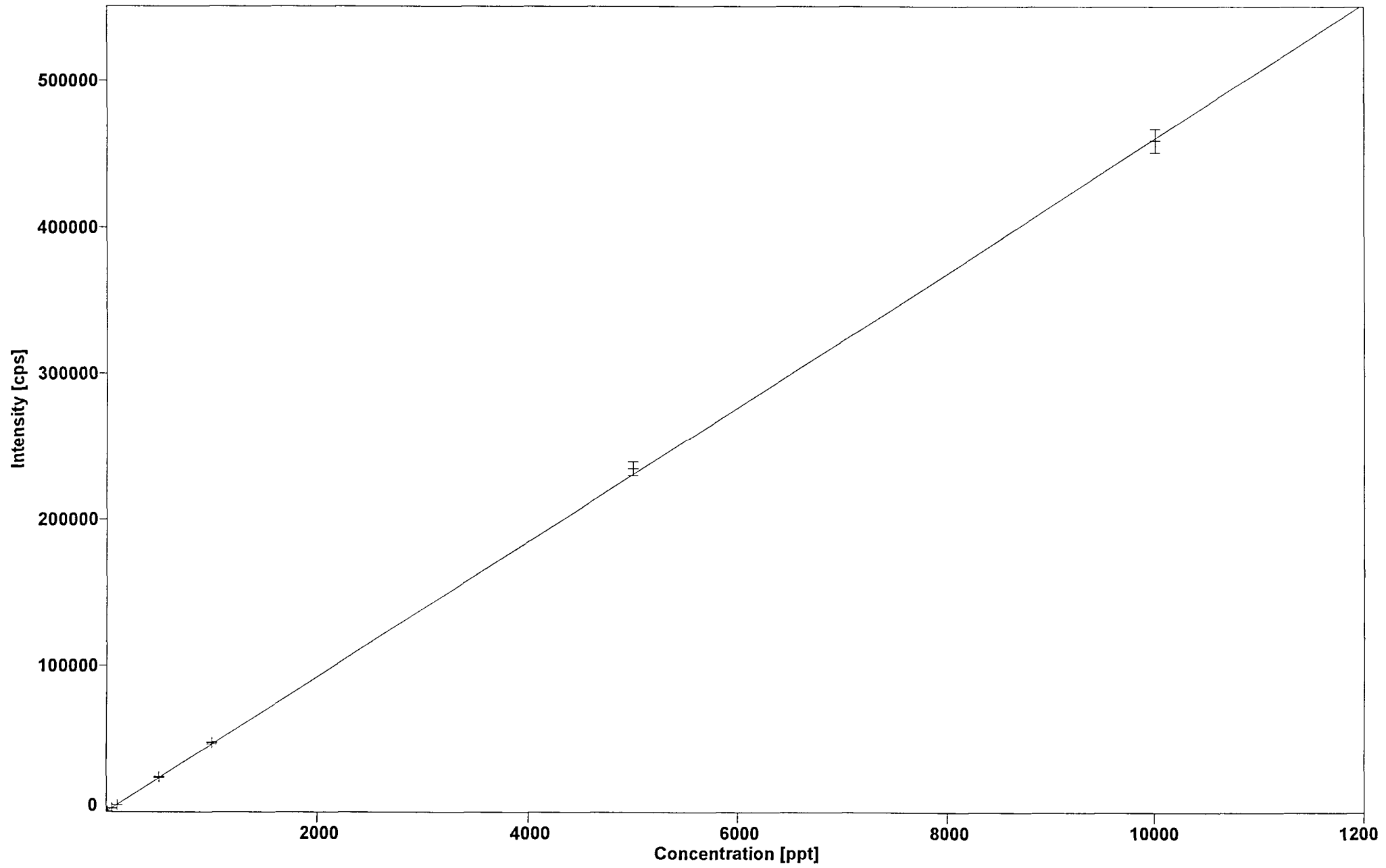
Eu151(LR) $y = 42.79 * x + 263.63$ Corr. Coeff. : 0.99998 Regr. Type : Linear



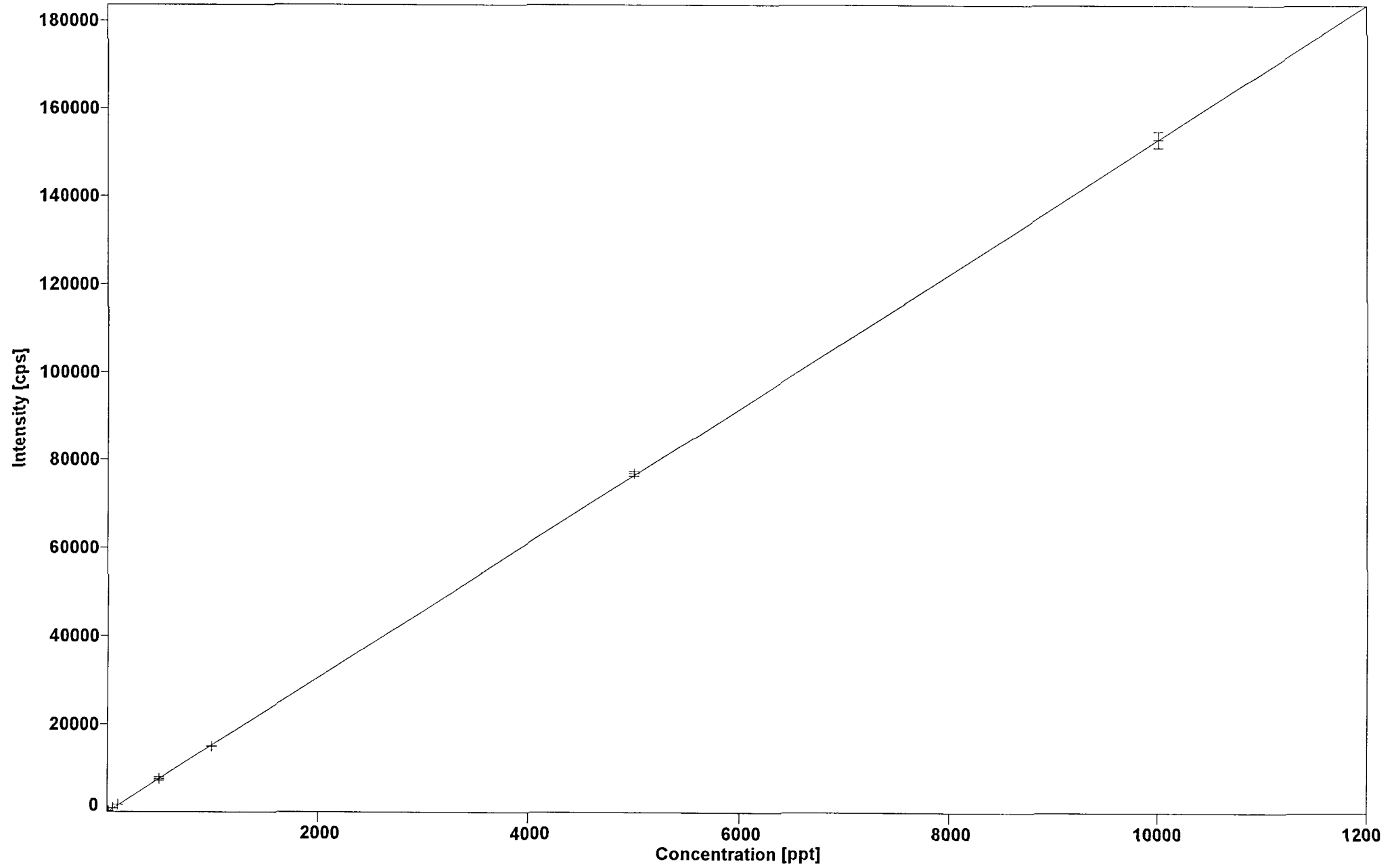
Sm152(LR) $y = 24.20 * x + 182.18$ Corr. Coeff. : 0.99998 Regr. Type : Linear



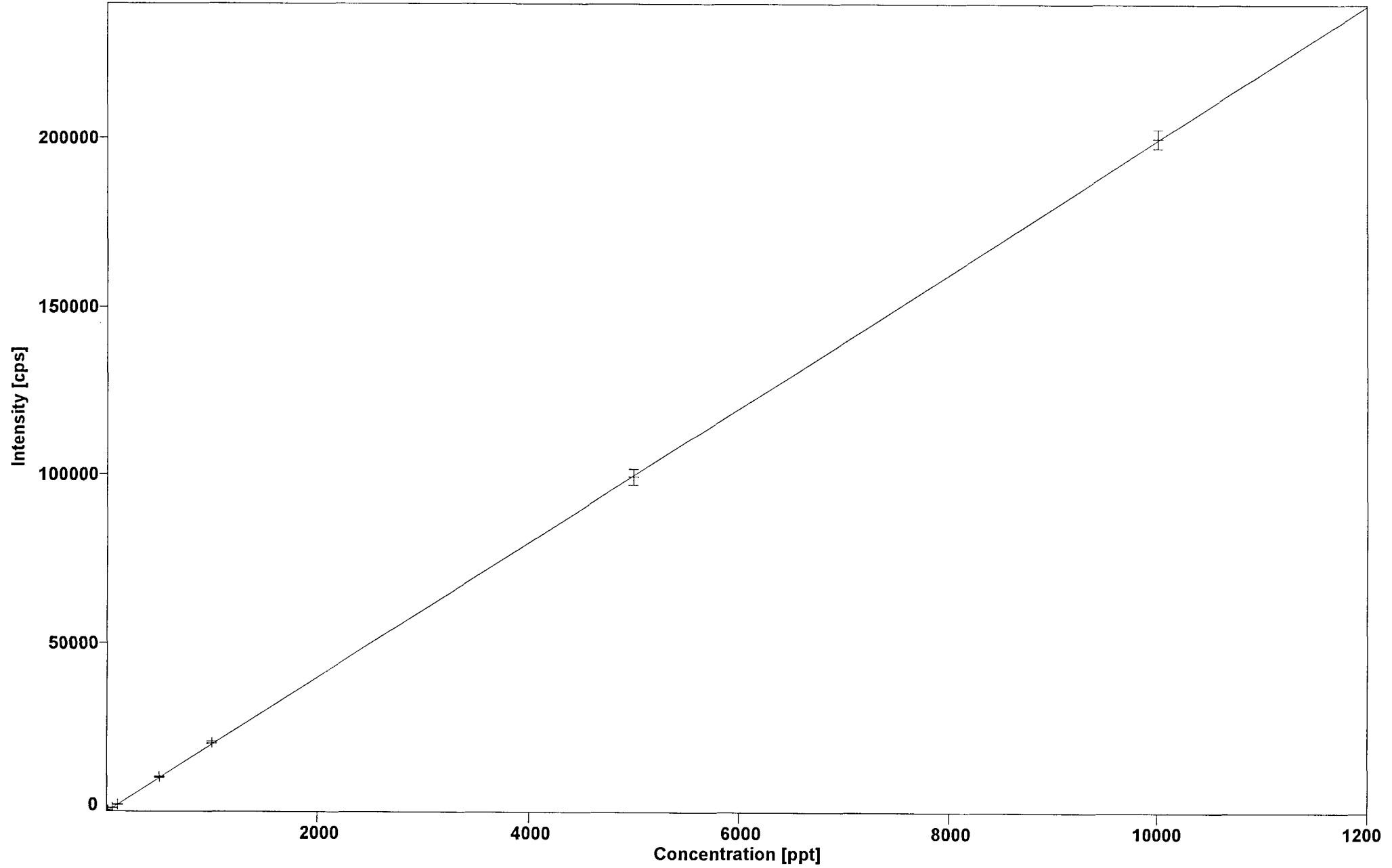
Eu153(LR) $y = 46.04 * x + 516.63$ Corr. Coeff. : 0.99996 Regr. Type : Linear



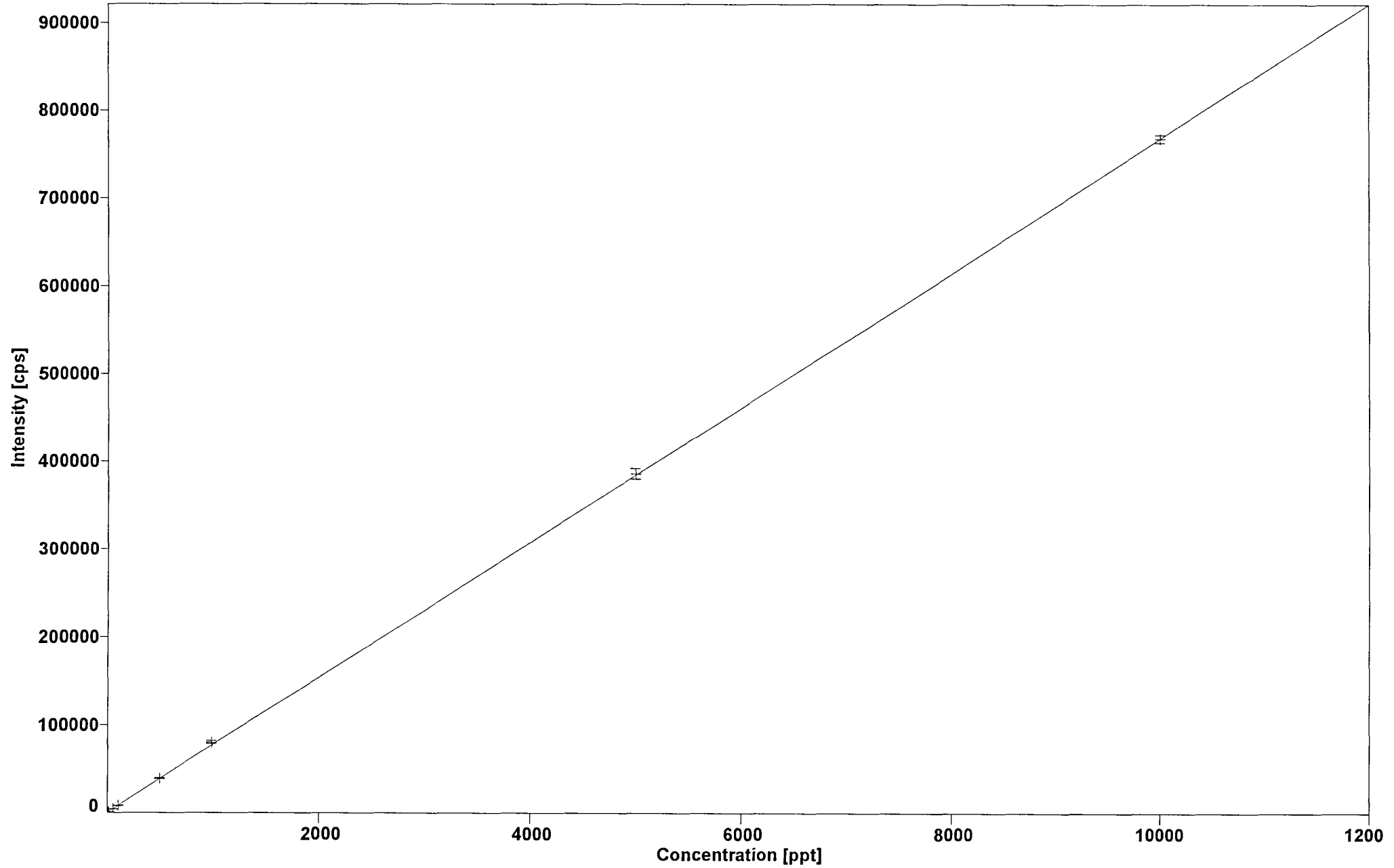
Gd157(LR) $y = 15.30 * x - 24.67$ Corr. Coeff. : 0.99999 Repr. Type : Linear



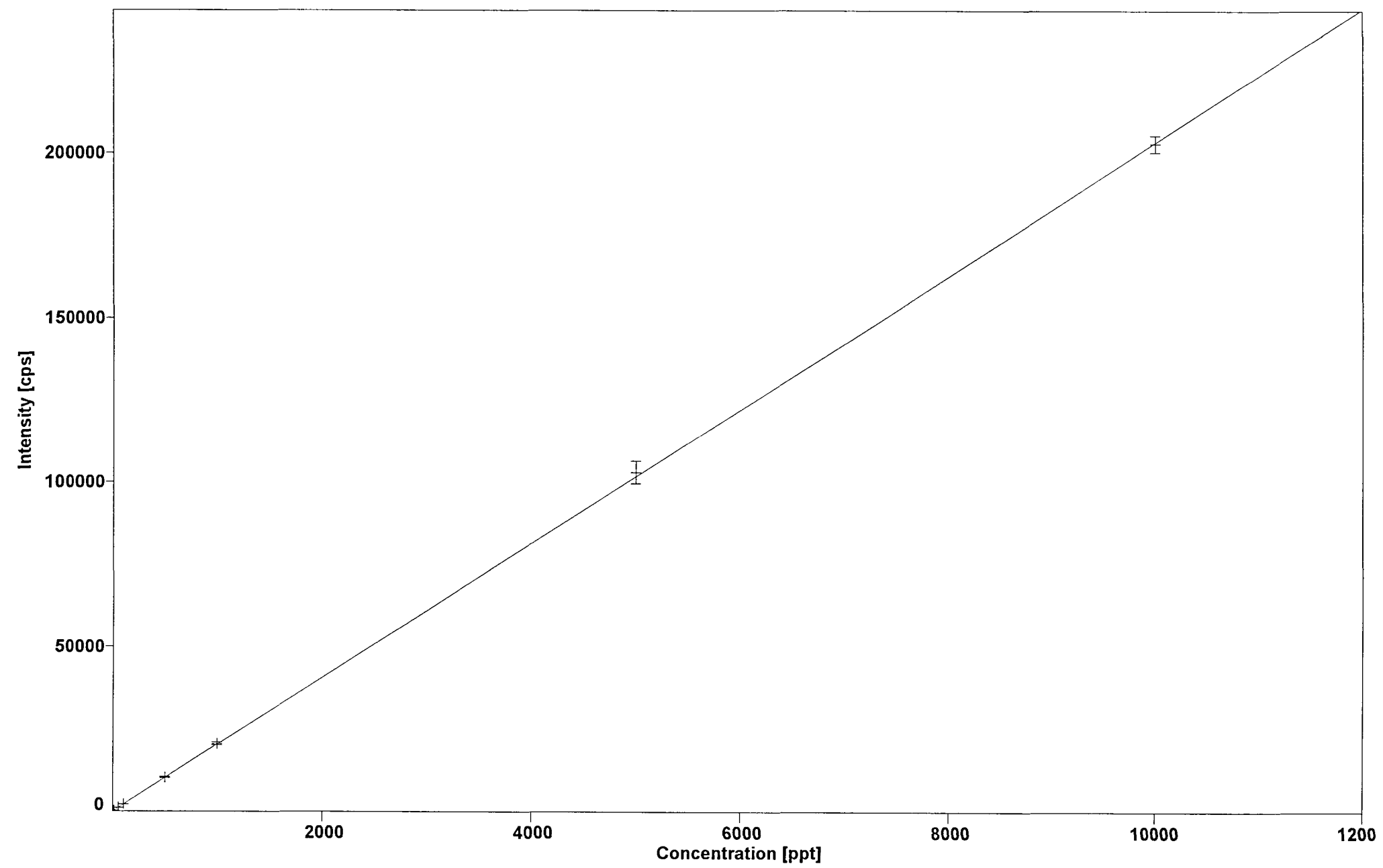
Gd158(LR) $y = 19.97 * x + 50.11$ Corr. Coeff. : 0.99999 Repr. Type : Linear



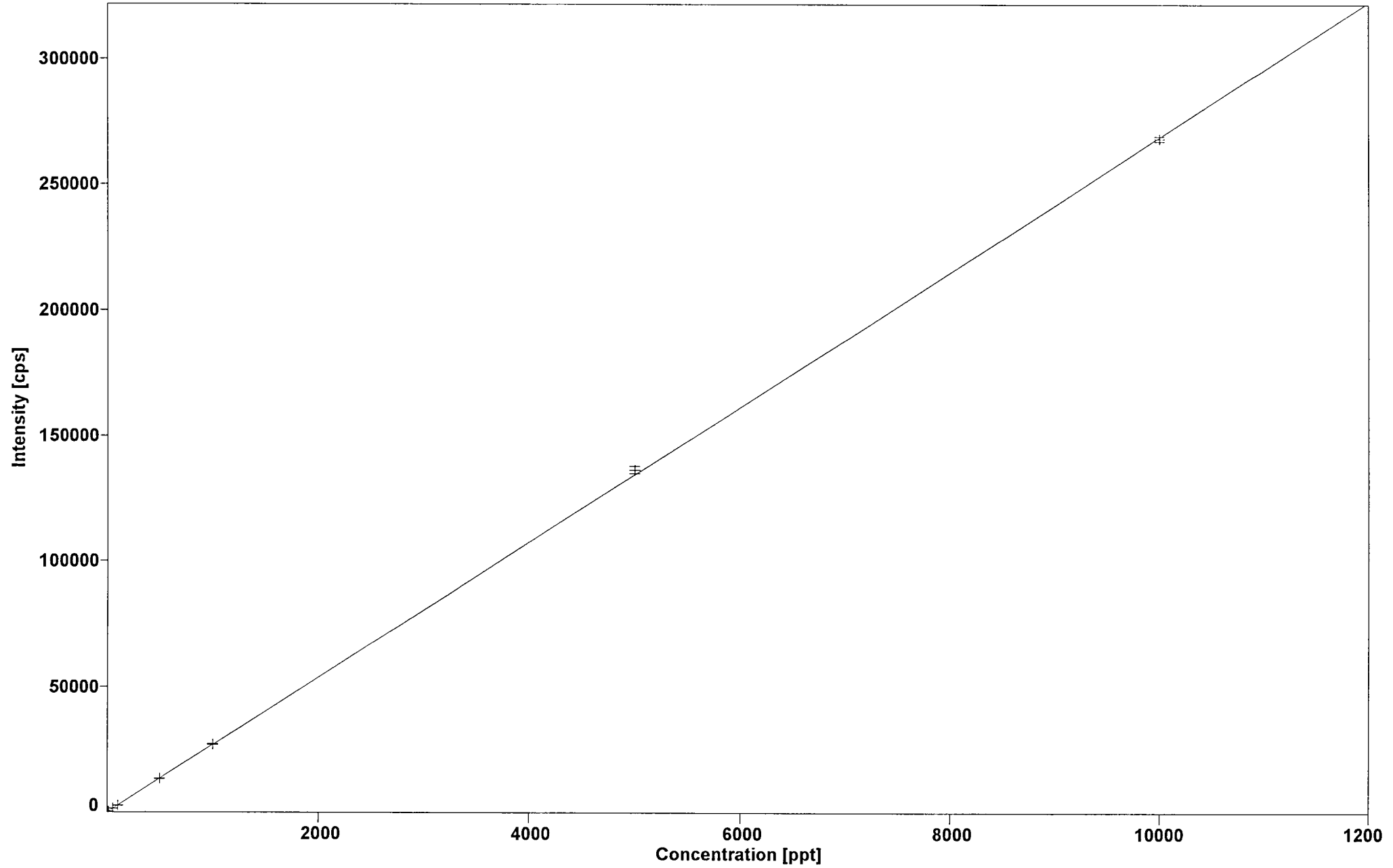
Tb159(LR) $y = 76.74 * x + 663.40$ Corr. Coeff. : 0.99999 Regr. Type : Linear



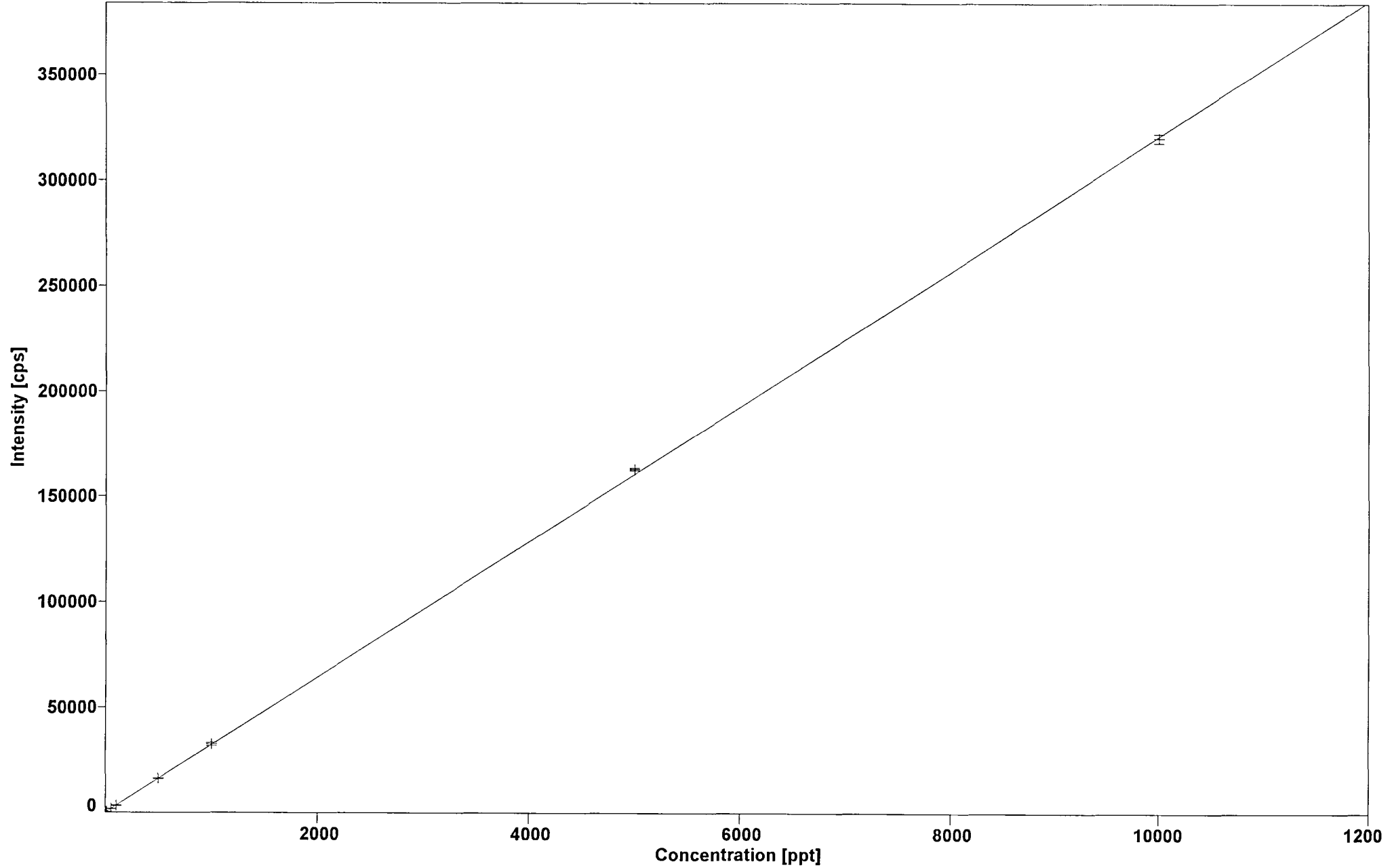
Dy161(LR) $y = 20.33 * x + 142.33$ Corr. Coeff. : 0.99998 Regr. Type : Linear



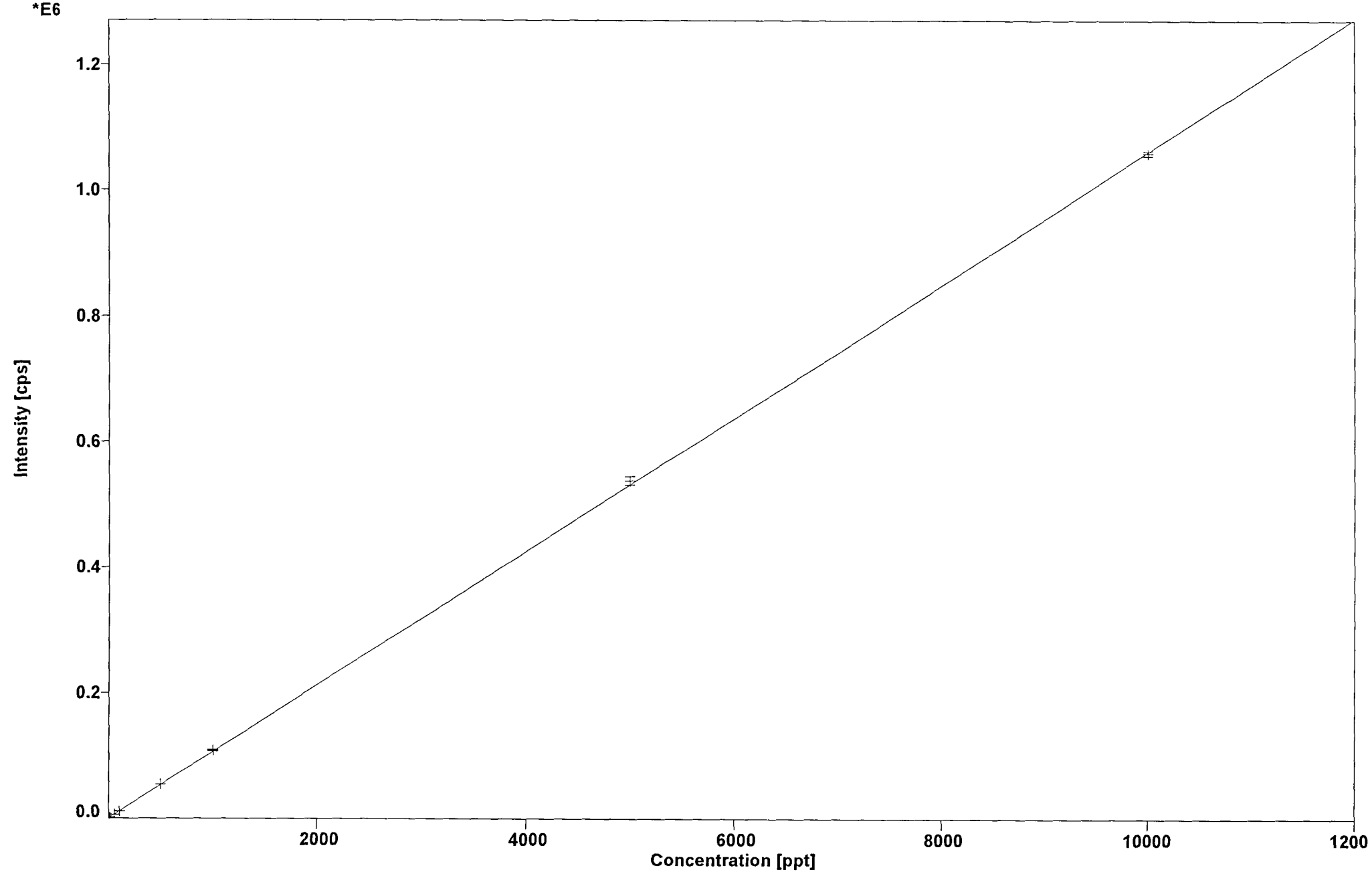
Dy163(LR) $y = 26.88 * x + 106.44$ Corr. Coeff. : 0.99997 Regr. Type : Linear



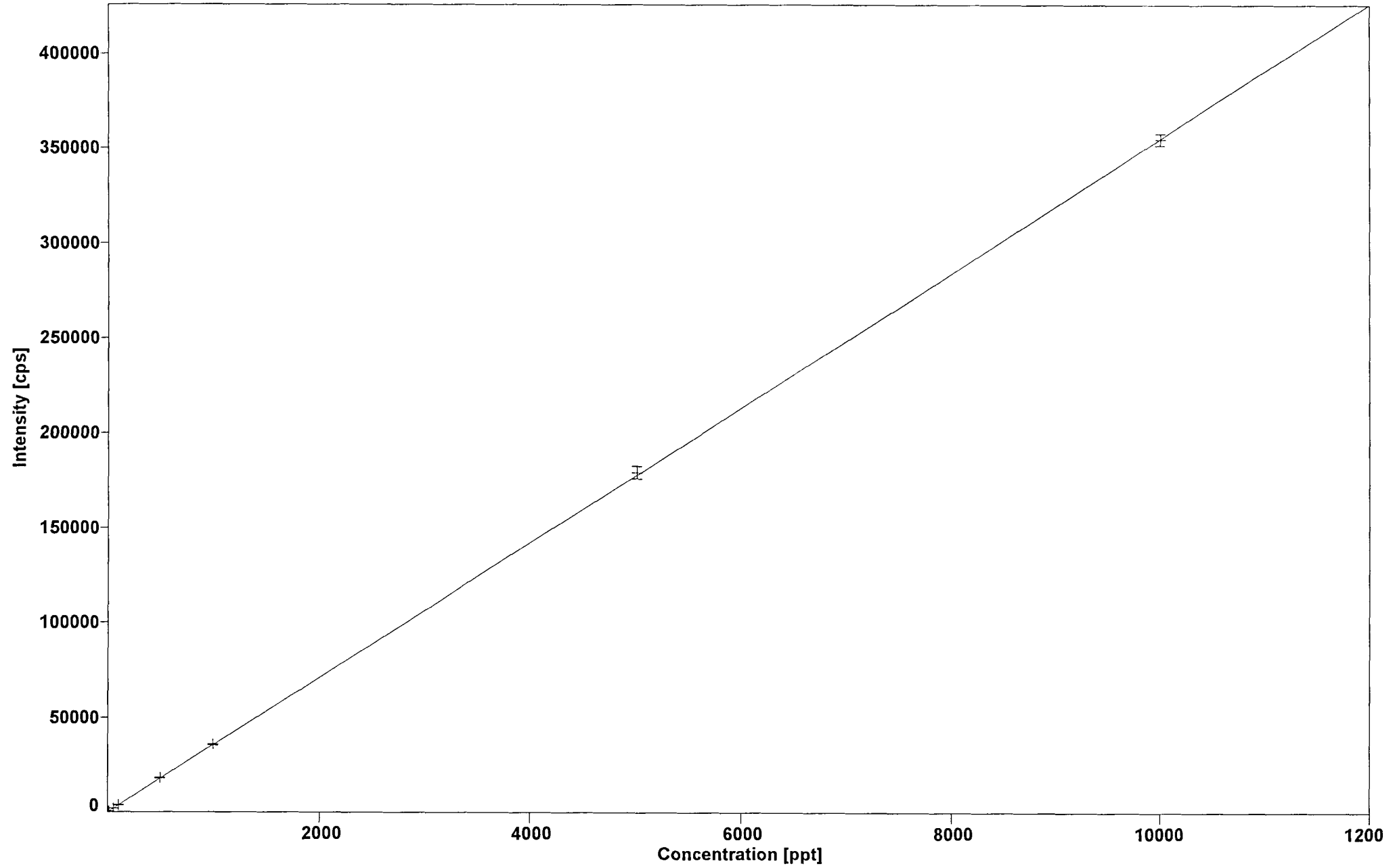
Dy164(LR) $y = 32.09 * x + 204.82$ Corr. Coeff. : 0.99997 Regr. Type : Linear



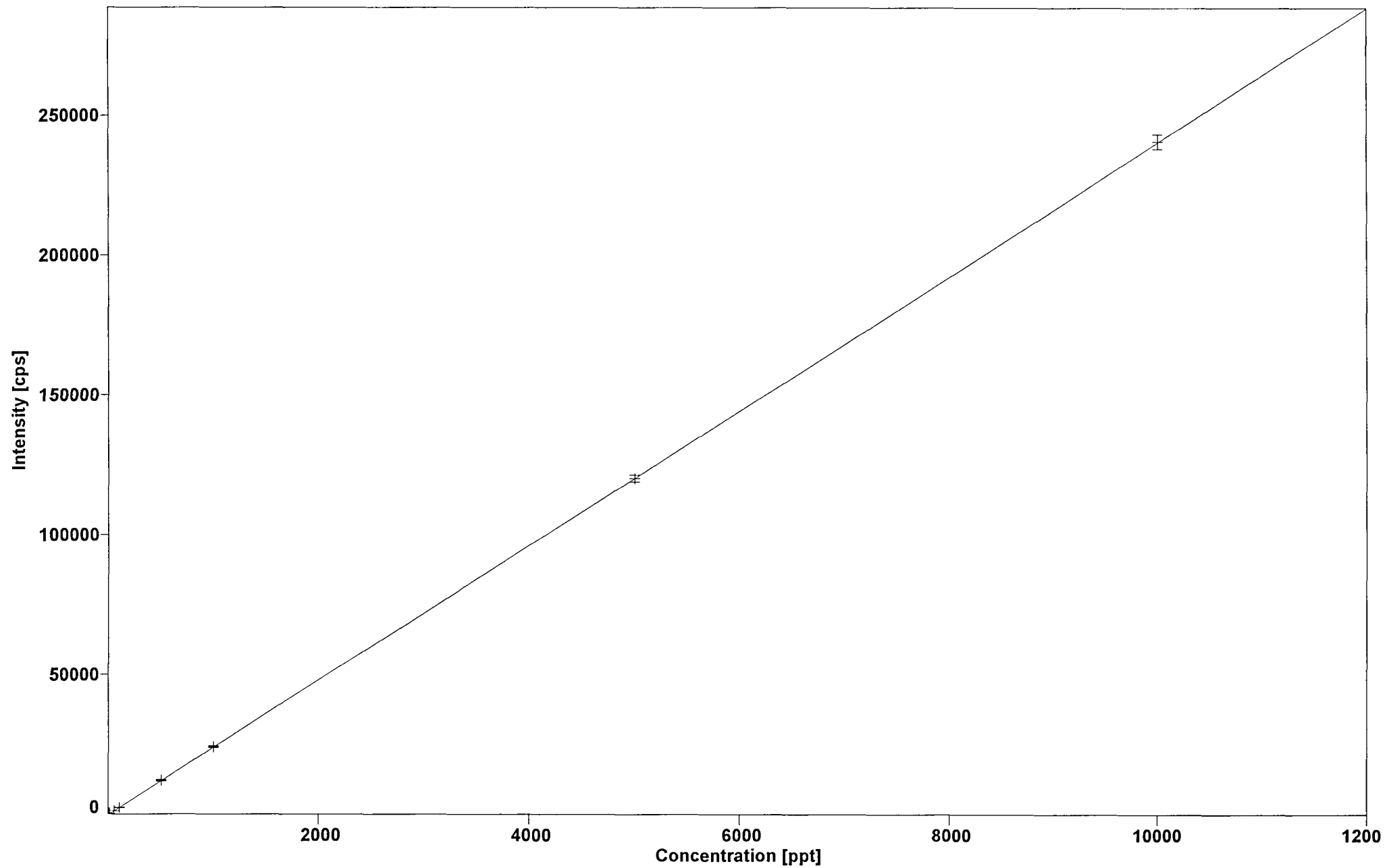
Ho165(LR) $y = 106.05 * x + 943.29$ Corr. Coeff. : 0.99998 Repr. Type : Linear



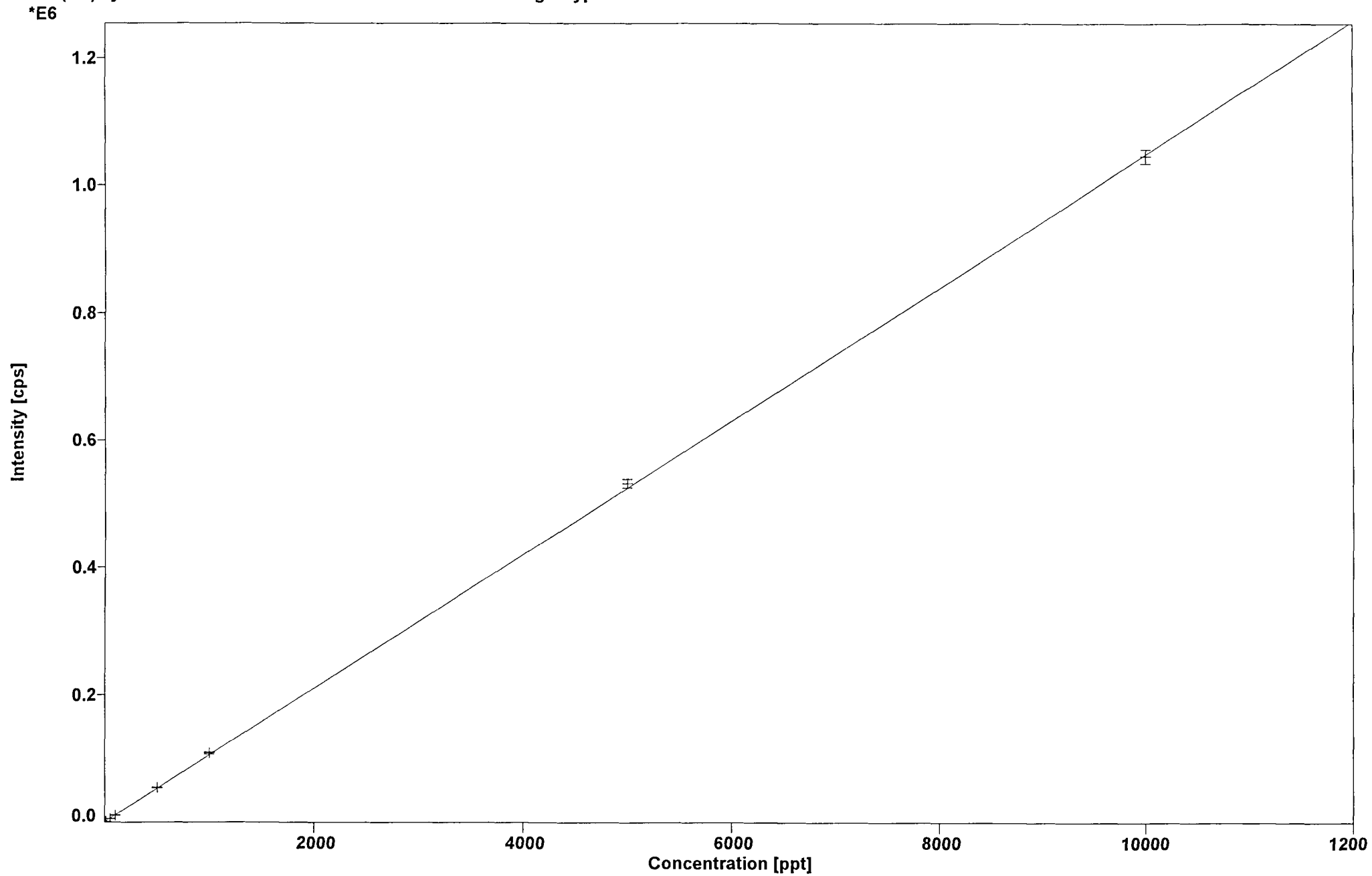
Er166(LR) $y = 35.53 * x + 88.65$ Corr. Coeff. : 0.99999 Repr. Type : Linear



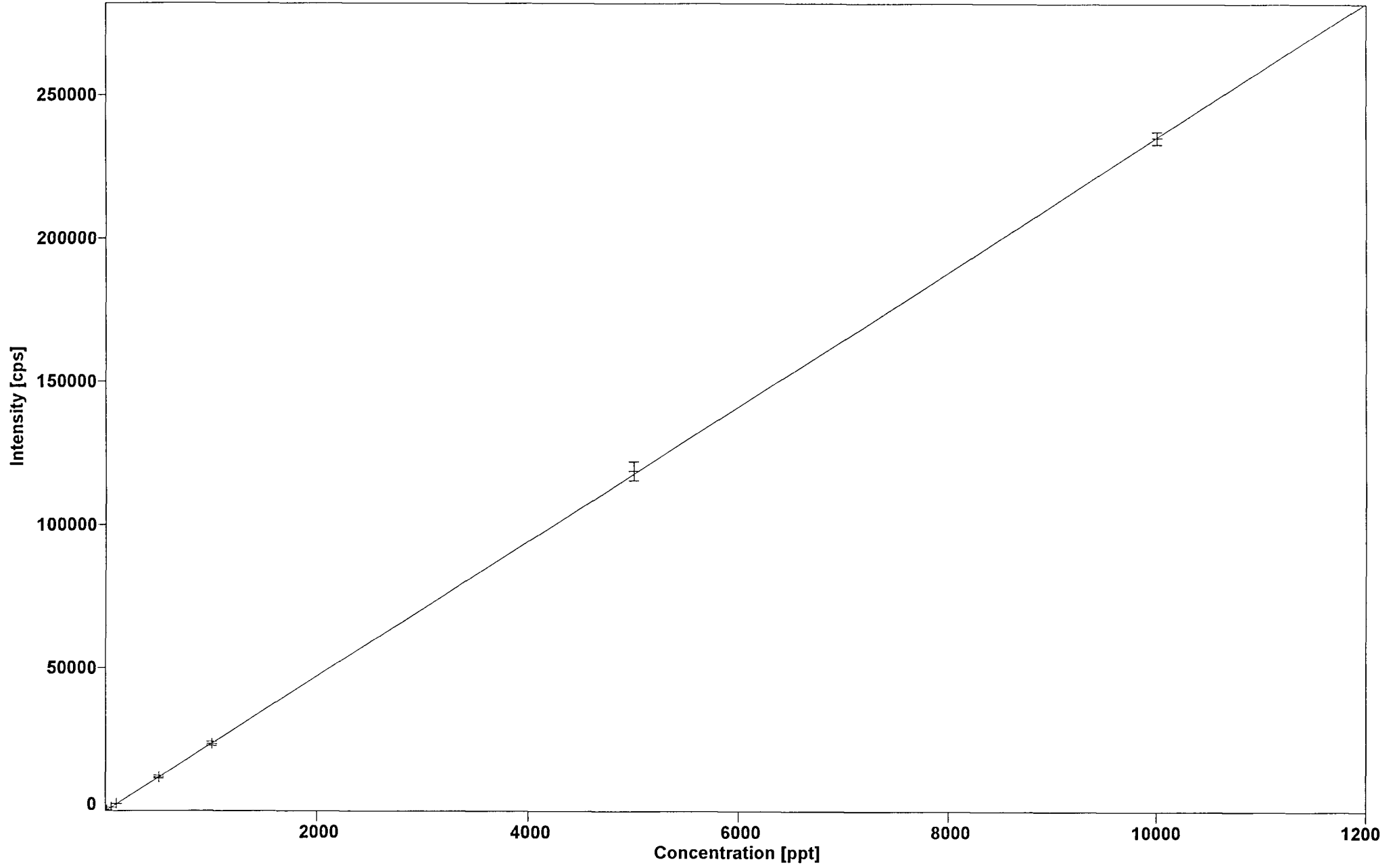
Er167(LR) $y = 24.05 * x - 47.48$ Corr. Coeff. : 1.00000 Regr. Type : Linear



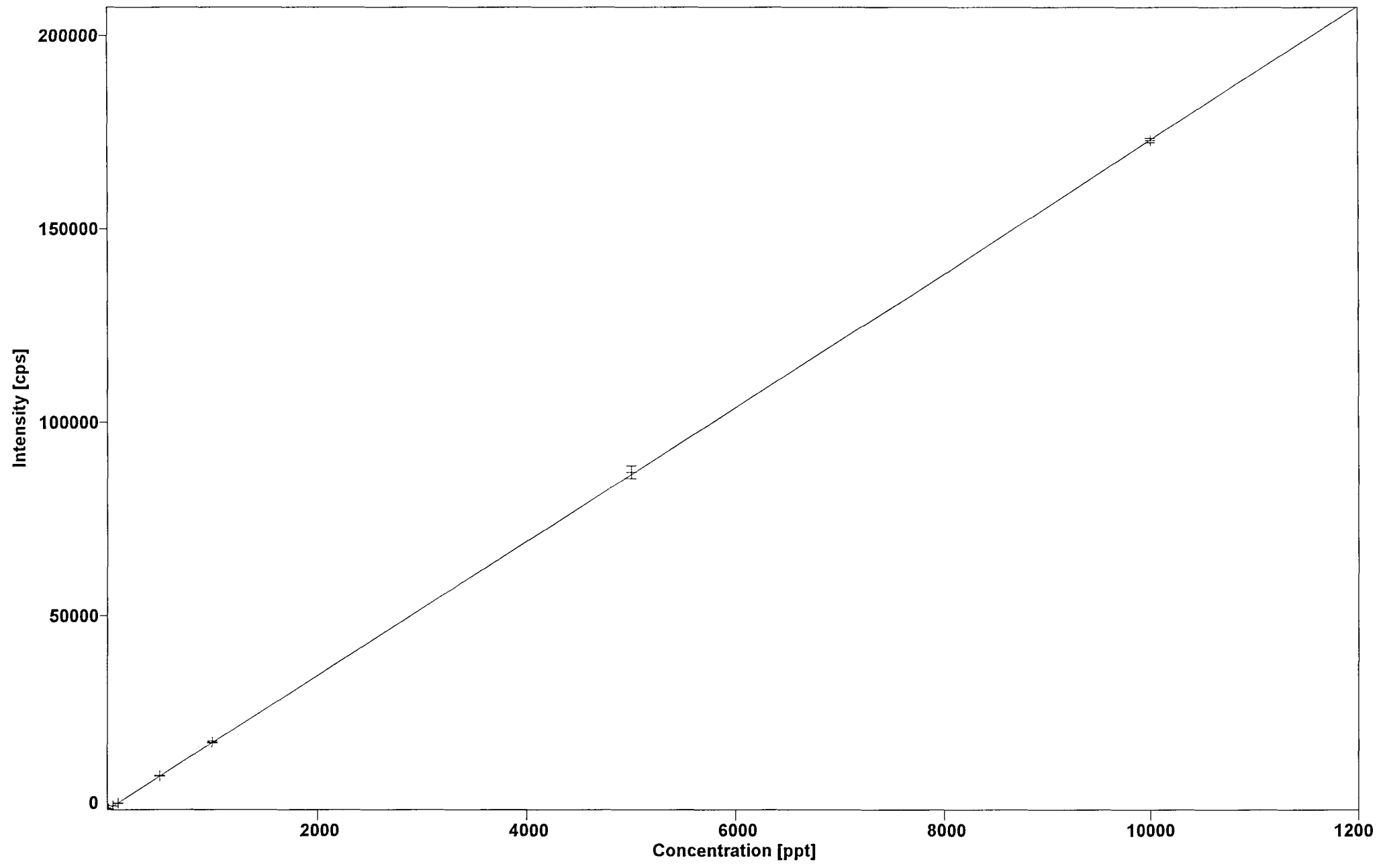
Tm169(LR) $y = 104.75 * x + 1173.67$ Corr. Coeff. : 0.99997 Regr. Type : Linear



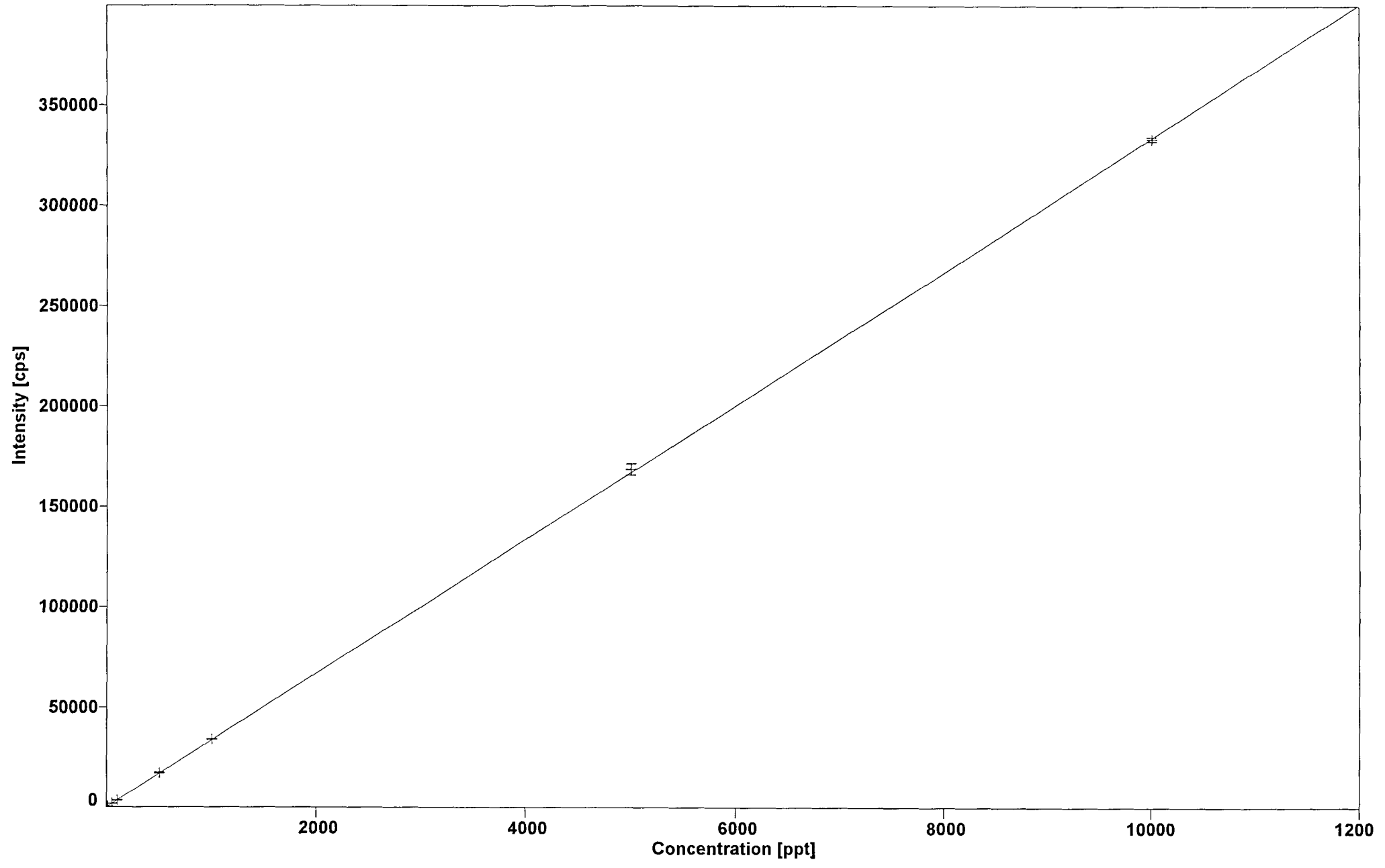
Yb172(LR) $y = 23.54 * x + 54.15$ Corr. Coeff. : 0.99999 Repr. Type : Linear



Yb173(LR) $y = 17.29 * x + 66.71$ Corr. Coeff. : 0.99999 Repr. Type : Linear

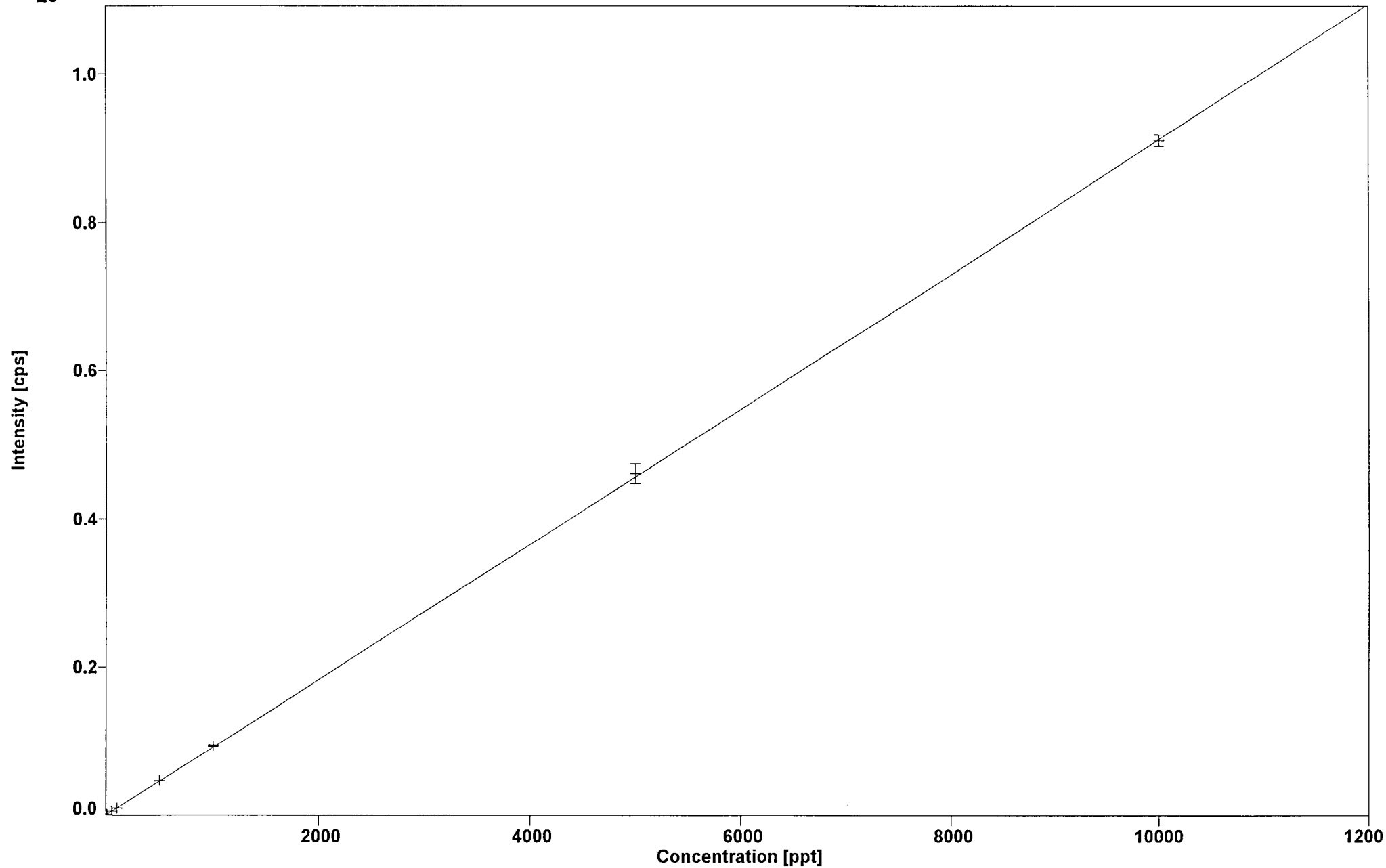


Yb174(LR) $y = 33.36 * x + 173.16$ Corr. Coeff. : 0.99999 Repr. Type : Linear



Lu175(LR) $y = 91.15 * x + 718.41$ Corr. Coeff. : 0.99998 Repr. Type : Linear

*E6



Th232(LR) $y = 119.30 * x - 3462.08$ Corr. Coeff. : 0.99713 Regr. Type : Linear
*E6

