

Ultrapure chemical analyses

The manufacture of specialized ultrapure chemicals for, e.g., the semiconductor industry demands clean room production facilities as well as thoroughly purified materials and reagents. Quality control of feed chemicals and finished products therefore requires detection of ultra-trace levels of impurities in complex matrices and solvents.

ALS Scandinavia has the analytical technology, the class 10000 environment, and the requisite experience of quantifying all conceivable impurity elements in all kinds of chemicals employed in the semiconductor industry. The ability to make routine measurements at ng/L levels is exemplified by results shown in Figure 1.

Our comprehensive screening package provides analytical data on the

concentrations of up to 72 elements (Table 1) – a much appreciated resource that has helped to solve problems with product failure by identifying unexpected sources of contamination.

To meet our customers' specific requirements, we also develop methods, in house, for application in all stages of ultrapure chemical manufacture – from product development, via pilot and production scale testing, to routine quality control of novel products and raw materials.

Needless to say, we can also provide routine analyses of semiconductor grade materials – water, hydrochloric acid, hydrogen peroxide, etc – at the levels required by the Semiconductor Equipment and Materials International industry standards (Table 1).

Whatever you need to know about elemental composition, ALS Scandinavia has the answer.

Isotope	LOQ	Isotope	LOQ	Isotope	LOQ	Isotope	LOQ
¹⁰⁷ Ag	0.4	¹⁵¹ Eu	0.004	²³ Na ^{**}	4	¹⁴⁷ Sm	0.02
²⁷ Al ^{**}	2	⁵⁶ Fe ^{**}	2	⁹³ Nb	0.005	¹¹⁸ Sn	2
⁷⁵ As ^{***}	2	⁶⁹ Ga ^{**}	0.07	¹⁴³ Nd	0.05	⁸⁸ Sr	0.08
¹⁹⁷ Au	0.4	¹⁵⁷ Gd	0.02	⁶⁰ Ni ^{**}	0.5	¹⁸¹ Ta	0.02
¹¹ B	2	⁷² Ge ^{**}	2	¹⁹² Os	0.7	¹⁵⁹ Tb	0.004
¹³⁸ Ba	0.07	¹⁷⁸ Hf	0.2	³¹ P ^{**}	20	¹²⁵ Te	0.3
⁹ Be	0.2	²⁰² Hg	2	²⁰⁸ Pb	0.05	²³² Th	0.05
²⁰⁹ Bi	0.03	¹⁶⁵ Ho	0-003	¹⁰⁵ Pd	0.03	⁴⁷ Ti ^{**}	2
⁷⁹ Br ^{**}	30	¹²⁷ I	0.9	¹⁴¹ Pr	0.008	²⁰⁵ Tl	0.006
⁴⁴ Ca ^{**}	20	¹¹⁵ In	0.3	¹⁹⁴ Pt	0.05	¹⁶⁹ Tm	0.002
¹¹¹ Cd	0.2	¹⁹³ Ir	0.04	⁸⁵ Rb	0.07	²³⁸ U	0.006
¹⁴⁰ Ce	0.03	³⁹ K ^{***}	3	¹⁸⁵ Re	0.002	⁵¹ V ^{**}	0.2
⁵⁹ Co ^{**}	0.09	¹³⁹ La	0.02	¹⁰³ Rh	0.006	¹⁴⁸ W	0.03
⁵² Cr ^{**}	0.4	⁷ Li	0.04	¹⁰¹ Ru	0.04	⁸⁹ Y	0.02
¹³³ Cs	0.02	¹⁷⁵ Lu	0.002	³² S ^{**}	20	¹⁷¹ Yb	0.03
⁶³ Cu ^{**}	2	²⁴ Mg ^{**}	3	¹²¹ Sb	0.09	⁶⁴ Zn ^{**}	2
¹⁶³ Dy	0.009	⁵⁵ Mn ^{**}	0.3	⁴⁵ Sc ^{**}	0.09	⁹⁰ Zr	0.2
¹⁶⁷ Er	0.009	⁹⁸ Mo	0.2	⁷⁷ Se ^{***}	7		

LOQ in ng/L

*calculated as 10 times the standard deviation for eight separate, sequentially analyzed, acidified aliquots. Mass resolution was 300 unless otherwise indicated: ** 4000; *** 10000.

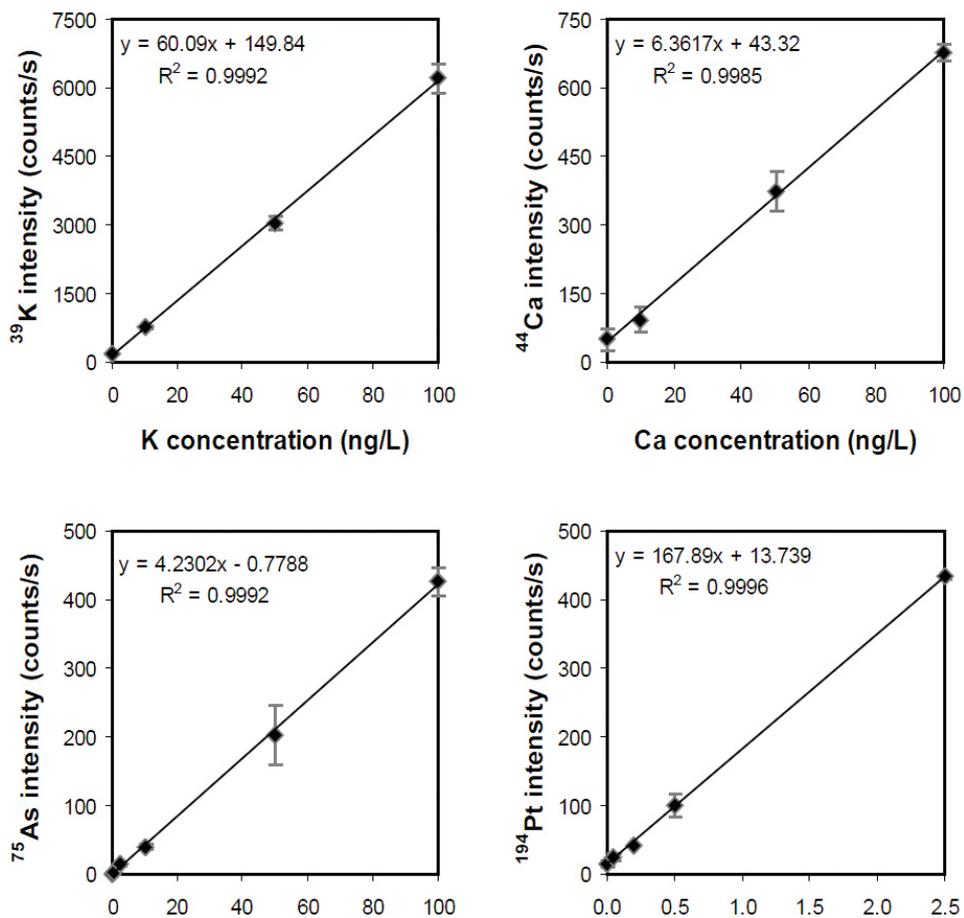


Figure 1. Calibration curves for K (resolution 10000), Ca (4000), As (10000) and Pt (300) in high purity water illustrate the ability to perform high quality measurements, indicated by the linearity at low ng/L levels. All results from the ALS Scandinavia laboratory.