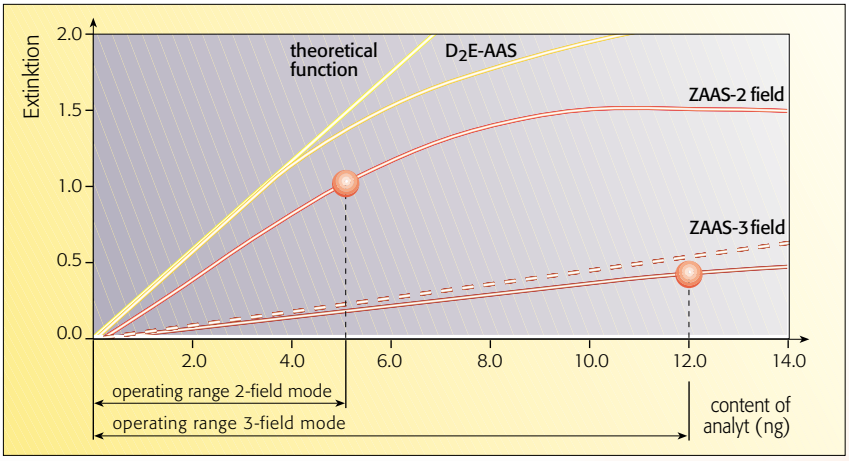
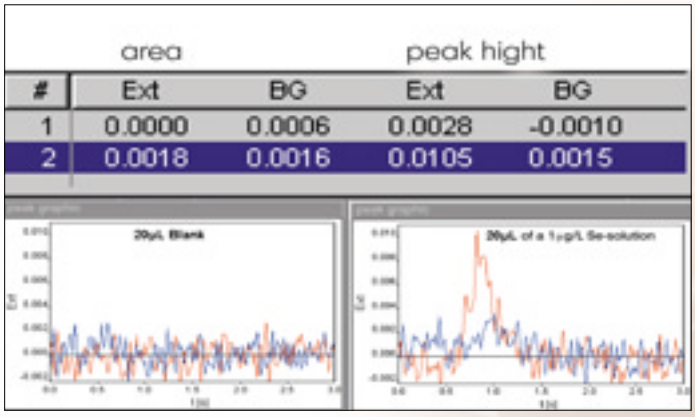
CGS 4005.01

Zeeman-effect background correction - powerful and variable, including 3-field mode

Notwithstanding the reduction of background influences brought by transverse heating, many graphite furnace AAS assignments are hampered by the problem of a structured background, which even a powerful deuterium system cannot fully correct. This is where the Zeeman effect can be used to advantage. Reduction to a single light source and the optimized, extremely high-transmissive optics of the AAS ZEEnit® 60 improve things considerably. Background and analyte signals are measured at the same wavelength and exactly corrected. Although its optical design corresponds to that of a single-beam spectrometer, the AAS ZEEnit® 60 has the baseline stability of a double-beam instrument.





	area		peak hight	
#	Ext	BG	Ext	BG
1	0.0000	0.0006	0.0028	-0.0010
2	0.0018	0.0016	0.0105	0.0015

Fig. top: Expanded working range of the calibration curve in the 3-field mode, compared to 2-field Zeeman AAS and deuterium techniques

Fig. bottom: Baseline stability and signal curve in the region of the detection limit, exemplified by Se

The signal curve of a selenium measurement, shown below, clearly proves the outstanding baseline stability and the new quality of measurement data processing achieved in the instrument.

Whereas the strength of the magnetic field is fixed in other commercial Zeeman systems, it can be varied in the AAS ZEEnit® 60. This gives the experienced user the possibility (in fact, the only possibility) to fully exploit the advantages of the this technology with elements of non-symmetric Zeeman splitting. In addition to the normally used 2-field mode (magnetic field off and on), the AAS ZEEnit® 60 with its unique 3-field mode offers analytical possibilities so far out of reach.

The exceptional advantages of this mode,

- signal reduction and
- expansion of the concentration range,

become effective especially in direct solid analysis.

In many applications, the sensitivity of graphite furnace AAS with transverse-heated tube is too high to allow the direct analysis of solids with concentrations in the upper ppm and, in part, percent ranges. The use of the 3-field mode reduces the analytical sensitivity up to ten times. In many cases, this will save the need to change to a less sensitive analytical line, use an increased stream of scavening gas during atomization, or dilute the sample with graphite powder or the like.