

## Pellets preparation for standards

Grinding samples using Geno/Grinder SPEX

Pellet pressing using Auto-CruShIR (Diameter of the die is 13 mm). Enclosed pellet (unknown sample) within tape thickness was 0.35 mm

Ratio between the diluent and elements of interest is calculated based on EXAFSPAK.

Question why density of the samples is not considered for this calculation? Would the density change significantly more than 1 g/cm<sup>3</sup> that usually taken for compacted sample.

$A = \mu \cdot X$ , yes  $\mu$  depends on density, but for the desired absorbance e.g., 1.6 and higher if density increasing thickness decreasing- it should not matter, however, **surface area and amount defines the ratio of the two compounds.**

An example cellulose: relative density = bulk density/solid density = 0.6/1.5 g/cm<sup>3</sup> = 0.33

Diameter of the die (for the pellets) is 13 mm. Area =  $\pi \times r^2 = 3.14 \times (0.75 \text{ cm})^2 = 1.76625 \text{ cm}^2$ .

Use EXAFSPAK to calculate the required ratio for the desired absorbance.

## As and Cellulose

```
sample4
Enter required maximum absorbance [2.00000] :2
Equivalent X-ray transmittance is 13.53%

Calculated sample composition:

Component 1 (specimen):  Fraction  Mass (g)  Formula
Component 2 (diluent) :  0.2450   0.0196   As
                        0.7550   0.0604   C6H10O5
Total:                   1.0000   0.0800

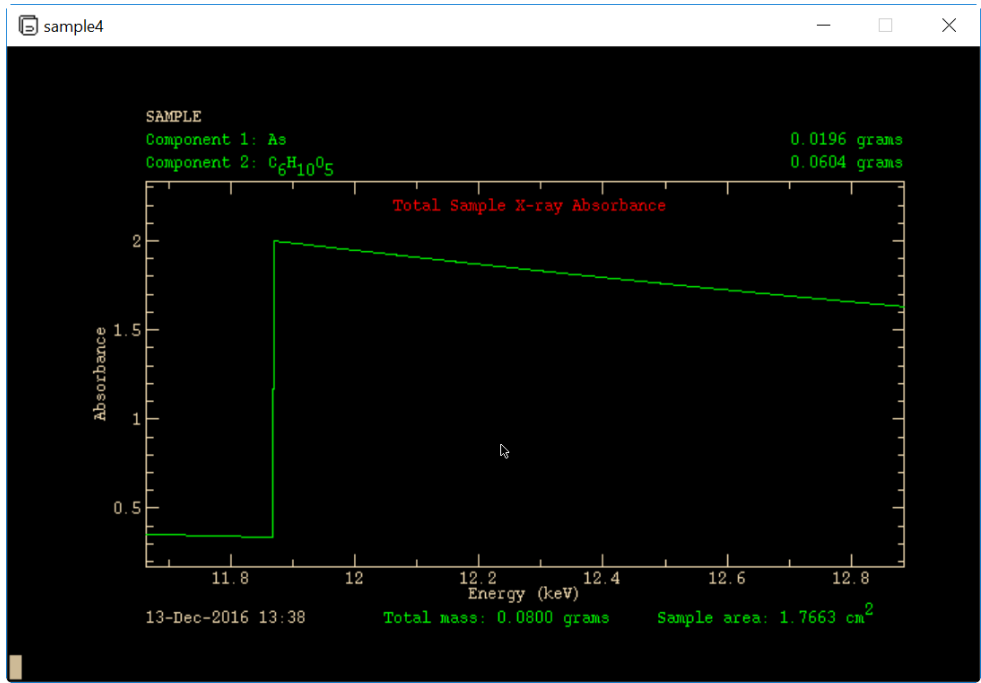
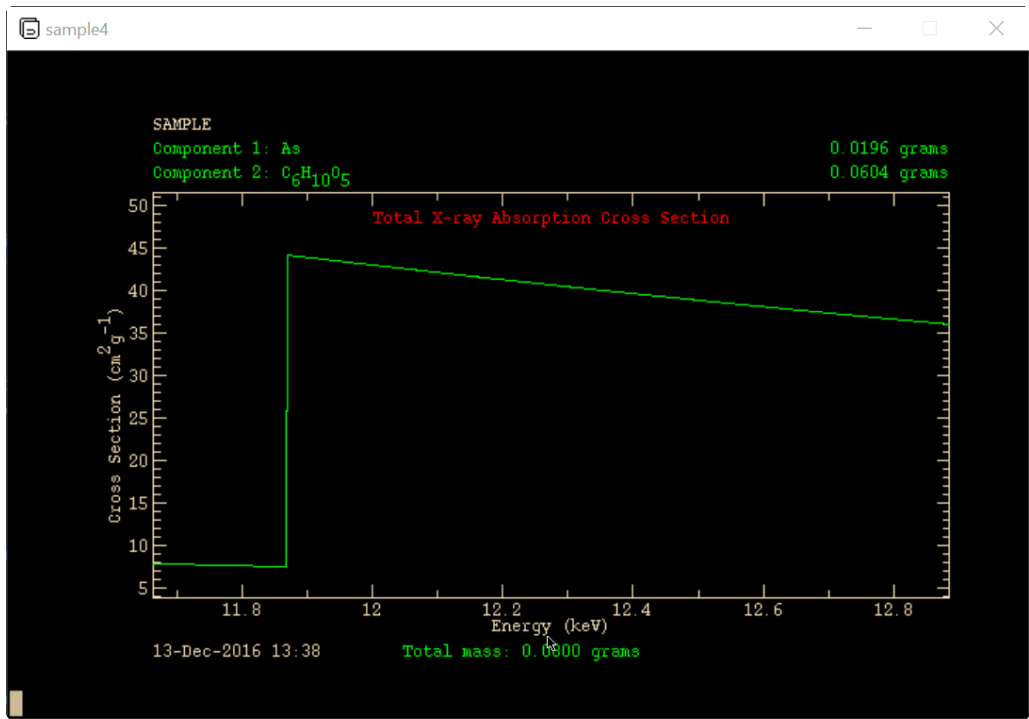
Calculated absorbances:

Energy (keV)  Absorbance
Start of scan: 11.665  0.354
Below edge:    11.868  0.336
Above edge:    11.870  2.000
End of scan:   12.885  1.630

Max. absorbance: 11.870  2.000
Min. absorbance: 11.868  0.336

Calculated edge-jump: 1.664 absorbance units

Press 1 to plot :
```



# Se and cellulose

```
sample4
Enter required maximum absorbance [2.00000] :2
Equivalent X-ray transmittance is 13.53%

Calculated sample composition:

Component 1 (specimen):  Fraction  Mass (g)  Formula
Component 2 (diluent) :  0.2862  0.0229  Se
                        0.7138  0.0571  C6H10O5
Total:                   1.0000  0.0800

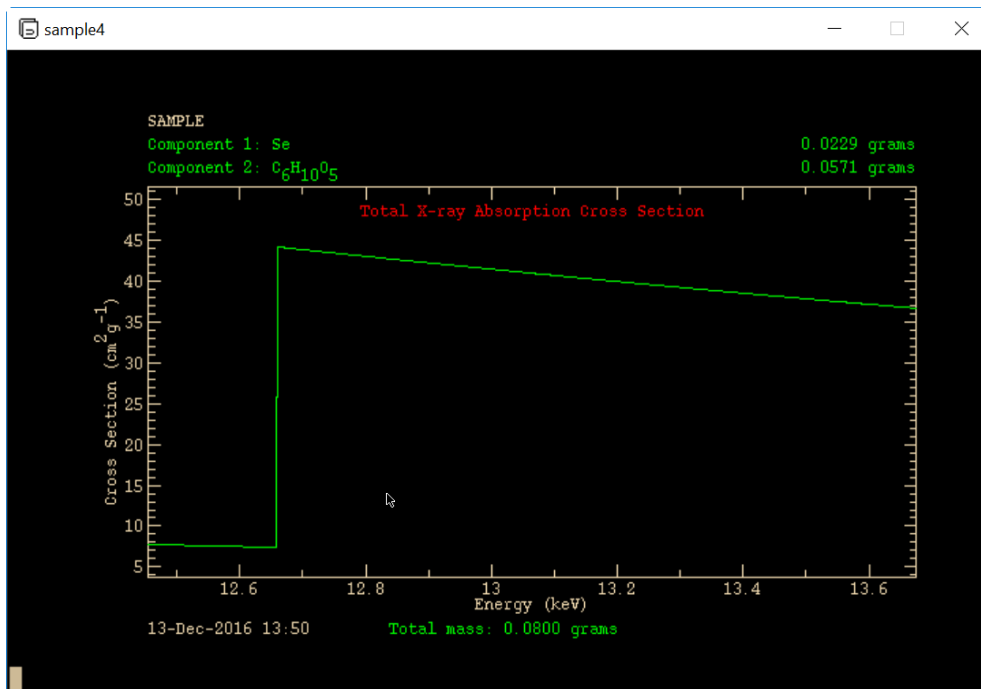
Calculated absorbances:

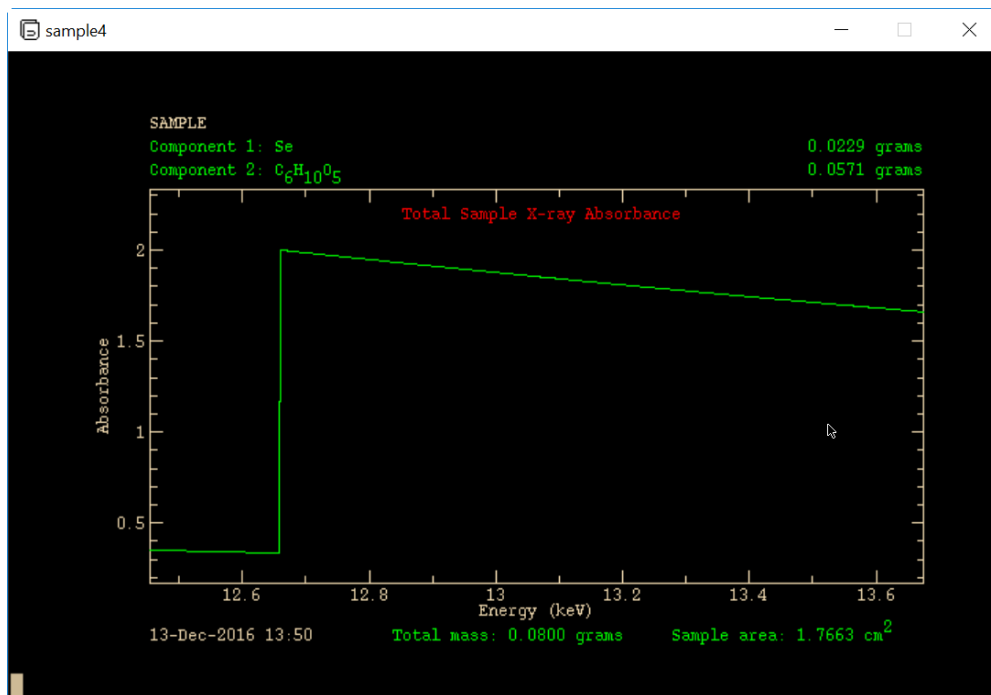
Start of scan:  Energy (keV)  Absorbance
Below edge:    12.455        0.351
Above edge:    12.658        0.335
End of scan:   12.660        2.000
                13.675        1.660

Max. absorbance: 12.660        2.000
Min. absorbance: 12.658        0.335

Calculated edge-jump: 1.665 absorbance units

Press 1 to plot : █
```





Checked absorbance for 100 mg Total mass for Se and cellulose. It is slightly different from the suggested mass. Therefore, will prepare a cellulose pellet from the recommended amount to check thickness as well as how brittle it is.

sample4

Enter required maximum absorbance [2.00000] :2  
Equivalent X-ray transmittance is 13.53%

Calculated sample composition:

	Fraction	Mass (g)	Formula
Component 1 (specimen):	0.2268	0.0227	Se
Component 2 (diluent) :	0.7732	0.0773	C6H10O5
Total:	1.0000	0.1000	

Calculated absorbances:

	Energy (keV)	Absorbance
Start of scan:	12.455	0.368
Below edge:	12.658	0.351
Above edge:	12.660	2.000
End of scan:	13.675	1.659
Max. absorbance:	12.660	2.000
Min. absorbance:	12.658	0.351

Calculated edge-jump: 1.649 absorbance units

Press 1 to plot :