

The University of Surrey Ion Beam Centre

An EPSRC supported National Facility

The Ion Beam Analysis Laboratory

Report on α decay of two lead book pages

For Matthew Hood, Jordan Codices Group

G469, Job ##4405, 4475

23rd August 2016, C. Jeynes

(minor revision to Figure on p.2 16th September)

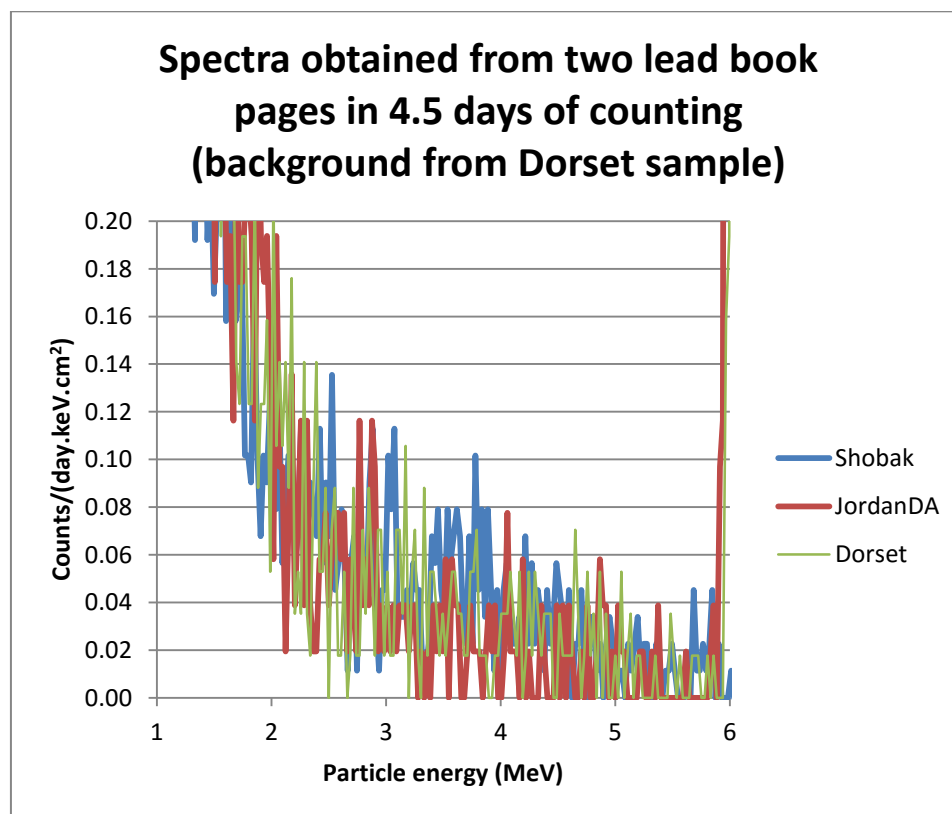
Samples and Purpose of Analysis

Weathered lead from a Roman site in Dorset obtained from Matthew Hood (see email 3rd June) which can be confidently dated (old!) is counted (#4405). Also RBS data is obtained to verify that the sample is lead to the surface. This is to verify that old lead does not count.

Two closed codices of six sheets each (#4475) were opened on 1st July with Jean-Claude Bragard, and David & Jennifer Elkington (also with Roger Webb and the photographer) present. One is known as the “Shovak” codex (see email from Matthew Hood, MH, 30th June) and the other is a codex from the Jordanian Department of Antiquities. We will call this the “JDA codex”.

The JDA codex was described by J-CB in an email to CJ of 15th June 2016, and MH subsequently (5th August) sent me a copy of an authorisation letter to “Mr & Mrs Elkington” from the Prof. Ziad al Saad of the Jordanian Department of Antiquities dated 21st April 2011.

Results

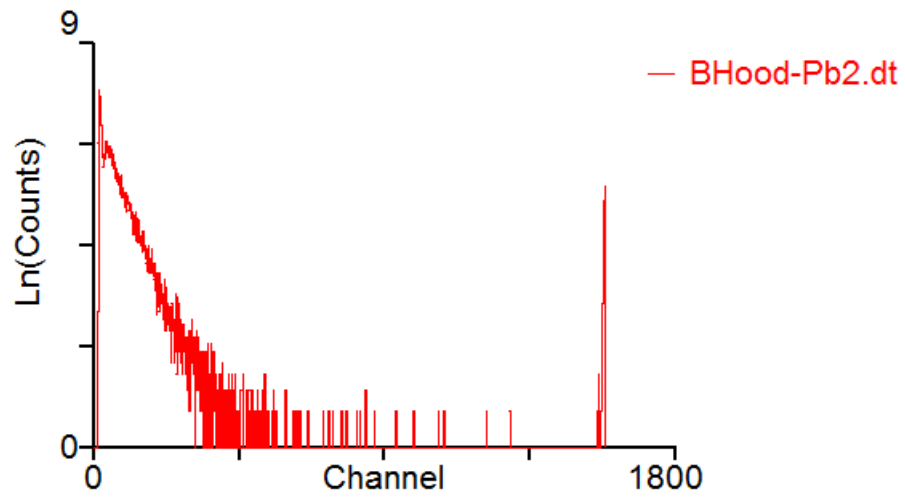


The Figure shows the normalised counts from both samples. We are looking for a signal with a high energy edge at 5.3 MeV. This appears not to be present.

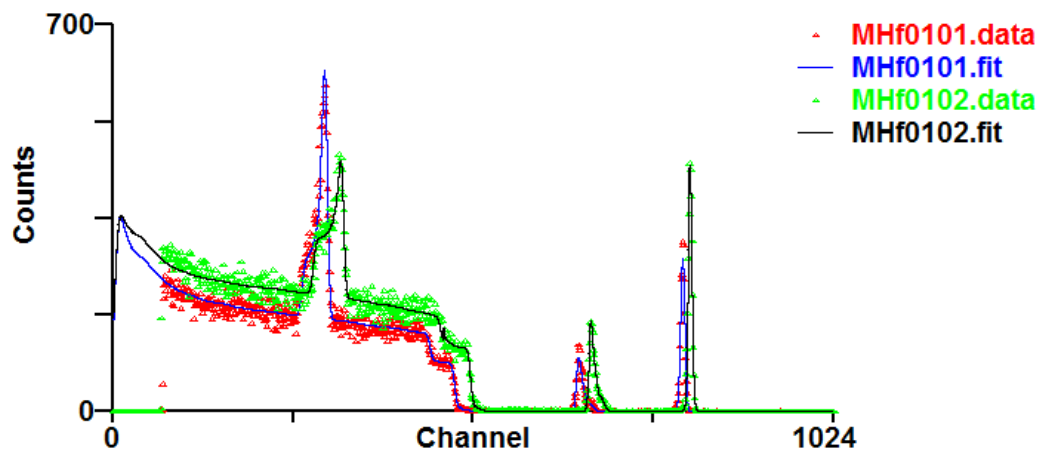
Conclusions

All samples appear to be equivalent (older than we can measure)

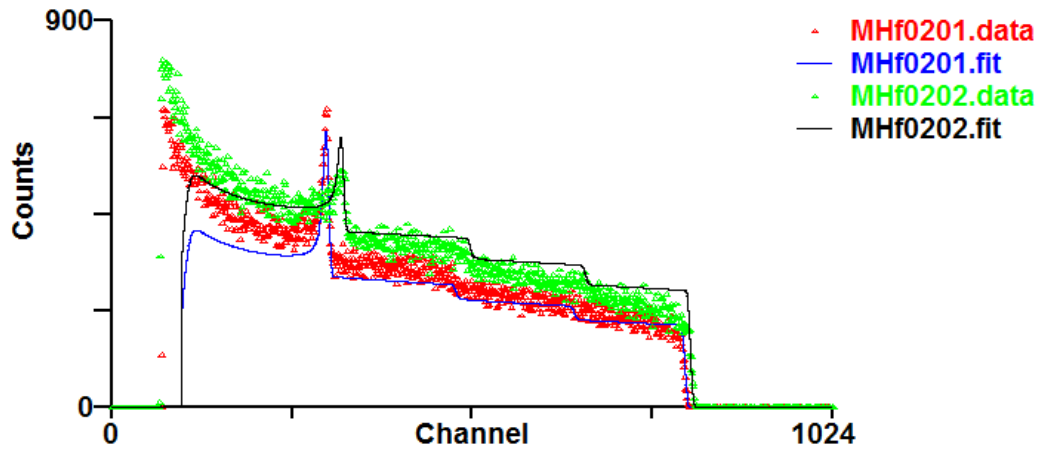
Results (7th June)



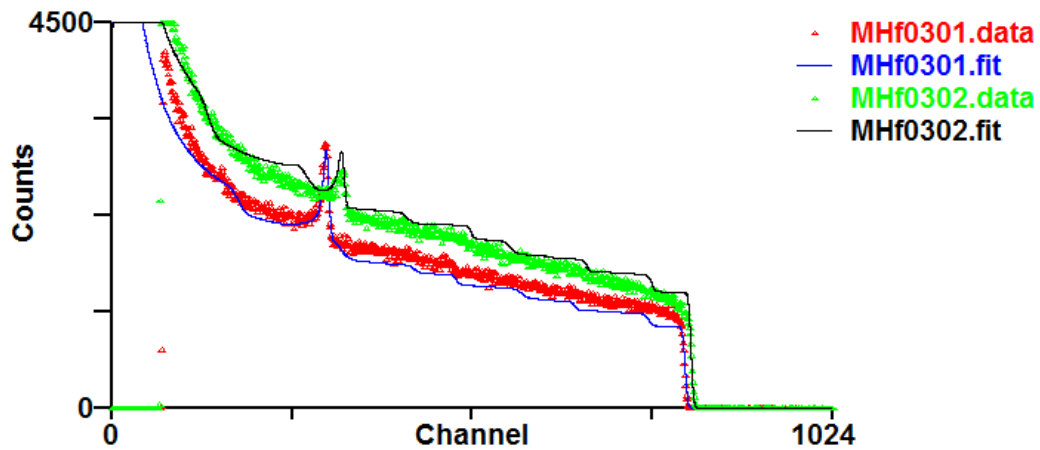
Results (and analytical conditions) (15th June)



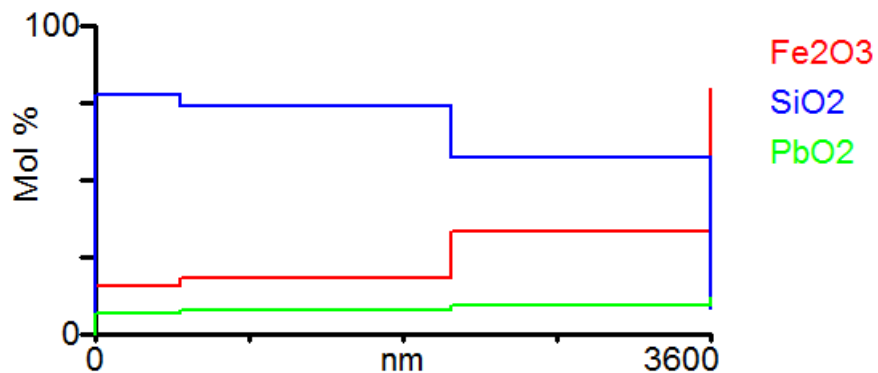
Calibration sample (Au/Ni/SiO₂/Si). 3039 keV: detA, detB had gains of 3.40, 3.36 keV/channel



This is the Roman lead from Dorset with 3039 keV He. Fitted with (these numbers are only approximate!): 30at% Fe_2O_3 , 66at% SiO_2 , 4% Pb. There is lead to the surface, but significantly attenuated.



As before, another area. This is similar but the thickness of the mineralised layer is different.



This is the structure used for fitting: it just gives an indication of the composition (mostly silicates, with other components).

Results (1st July)

Page 6 of the Shovak codex is placed in front of the A detector (aperture 70.9 mm²).

Page 6 of the JDA codex is placed in front of the B detector (aperture 41.8 mm²).

Detection channels A, B had gains of 3.40, 3.36 keV/channel.

We counted for 396688 secs (4.6 days). This time was obtained from the pulser signal.

The collected spectra for the Devon piece, and the Shovak and JordanDA codices were compressed to 256 channels (see spreadsheet) but not smoothed.