

## Galena Lead Isotope Investigation of Samples From Yukon Territory

Janet E. Gabites,  
Geochronology Laboratory, U.B.C.

### Results

Two samples of galena from the Lily Pad deposit, one galena from a showing in the Illyd Limestone, and one K-feldspar from the Keewenaw open pit have been analysed for lead isotopes. The analyses have been plotted on a  $^{207}\text{Pb}/^{204}\text{Pb}$  v.  $^{206}\text{Pb}/^{204}\text{Pb}$  diagram (Figure 1) with the shale curve for reference, and data from Glasmacher (1990) for comparison. The shale curve was calculated from data from sediment-hosted stratiform deposits in the miogeocline of the Canadian Cordillera, and thus provides a reference curve for upper continental and upper crustal environments in this broad geographic area (Godwin *et al.*, 1988).

Sample 95DH-106, collected from a showing in the Illyd Limestone in the Richardson Trough, plots near the shale curve of Godwin and Sinclair (1982) at around 550 Ma. This would be consistent with an age of mineralization close to that of the Cambrian limestone host rocks.

Samples 95CH LP-1 and 2 (Leadfile numbers -003 and -004) from the Lily Pad/ Frog deposit plot below the shale curve (which also appears to closely approximate lead isotopic evolution in the Yukon-Tanana and Nisling terranes). These two samples cluster with those collected from Prospector Mountain by Glasmacher and analysed previously in this laboratory. The lead in these samples may be magmatic in origin, however no feldspar lead isotopic information is available to confirm this.

Feldspar was analysed from a pegmatitic dyke cross-cutting mineralized diorite at the Keewenaw open pit, within the Whitehorse batholith. The analysis is relatively non-radiogenic and the analysis will have to be interpreted by comparison to other lead isotopic measurements from this area.

### Analytical Techniques

Small clean cubes of galena were handpicked, washed, and dissolved in dilute hydrochloric acid. Trace lead samples were prepared by hand picking 10-50mg of clean sulphide, feldspar, or whole rock, which was leached in dilute hydrochloric acid to remove surface contamination before dissolution in nitric acid. The samples were passed through ion exchange columns in hydrobromic acid, and the lead collected in hydrochloric acid. Approximately 10-25ng of the lead in chloride form was loaded on a rhenium filament and isotopic compositions were determined using a modified VG54R thermal ionization mass spectrometer. The measured ratios were corrected for instrumental mass fractionation of 0.12% per mass unit based on repeated measurements of the N.B.S. SRM 981 Standard Isotopic Reference Material. Errors reported in Table 1 were obtained by propagating all mass fractionation and analytical errors through the calculation. Four of the samples were run in

duplicate as an internal check on analytical reproducibility. The total procedural blank on the trace lead chemistry was 700 pg.

## References

- Glasmacher, U. 1990. Petrogenetische und metallogenetische Entwicklung ausgewählter Gebiete im 'Yukon-Tanana Terrane' und 'Stikine Terrane', (Yukon Territorium, Kanada) während der Oberkreide und des Alttertiars. Unpublished PhD thesis, RWTH Aachen, Germany. 445p.
- Godwin, C.J., Gabites, J.E., and Andrew, A. 1988. LEADTABLE: A galena lead isotope database for the Canadian Cordillera. *B.C. Geological Survey Branch Paper* 1988-4. 188p.
- Godwin, C.J. and Sinclair, A.J., 1982. Average lead isotope growth curves for shale-hosted zinc-lead deposits, Canadian Cordillera. *Economic Geology*, Volume 7, pages 675-690.

**Table 1. Galena Lead Isotope Data**

Sample	Min. Ru n	$^{206}\text{Pb}/^{204}\text{Pb}$	% error	$^{207}\text{Pb}/^{204}\text{Pb}$	% error	$^{208}\text{Pb}/^{204}\text{Pb}$	% error	$^{207}\text{Pb}/^{206}\text{Pb}$	% error	$^{208}\text{Pb}/^{206}\text{Pb}$	% error
95CH LP-1	gl A	19.1499	0.011	15.6363	0.009	38.7994	0.012	0.8165	0.005	2.0261	0.005
95CH LP-2	gl A	19.1616	0.002	15.6497	0.002	38.8350	0.002	0.8167	0.001	2.0267	0.001
95DH-106	gl A1	18.5496	0.022	15.6536	0.006	38.6543	0.022	0.8439	0.021	2.0839	0.001
95DH-106	gl A2	18.5889	0.005	15.6971	0.003	38.7854	0.007	0.8444	0.003	2.0865	0.005
95CH 19-1	ksp A	19.2485	0.074	15.6930	0.073	39.0125	0.075	0.8153	0.010	2.0268	0.008

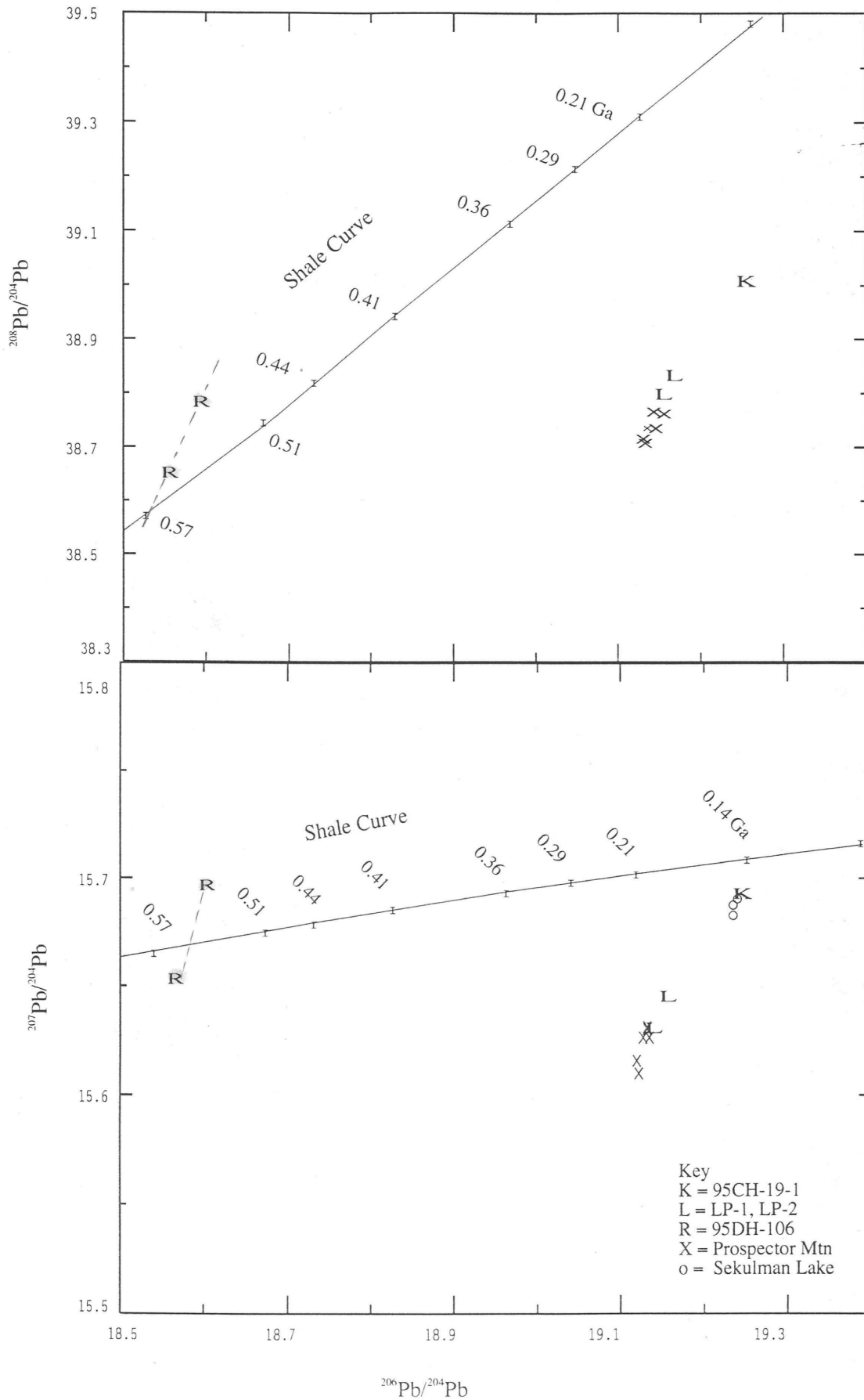
Notes:

Mineral analysed: gl = galena, ksp = K feldspar.

Repeat runs from same dissolution are denoted with A 1,2, etc.

Janet E. Gabites  
 Research Assistant,  
 Geochronology Laboratory, Department of Geological Sciences,  
 U.B.C.  
 Tel 822-6654, fax 822-6088

Figure 1:  $^{207}\text{Pb}/^{204}\text{Pb}$  v.  $^{206}\text{Pb}/^{204}\text{Pb}$  and  $^{208}\text{Pb}/^{204}\text{Pb}$  v.  $^{206}\text{Pb}/^{204}\text{Pb}$   
Galena Lead Isotope Data from Deposits in Yukon Territory



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