



Detecting the Undetectable Lithium

by pXRF

Background

A portable XRF (pXRF) instrument can detect elements down to Mg (Z12). While pXRF cannot detect lithium (Z3) directly it can detect elements associated with LCT Pegmatite mineralisation (opposite). Directly detecting this suite of elements on the pXRF and other elements associated with LCT Pegmatites an estimation of the lithium content is made; referred to as the Lithium Index.

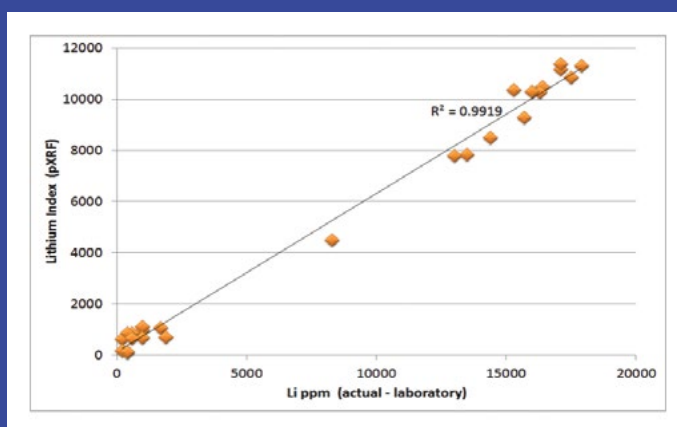
LCT elements	Z#	Detectable by pXRF	Detection limit (CAMIRO)	Appropriate for rocks	Appropriate for soils
Li	3	NO	n/a	Index Calc	Index Calc
Be	4	NO	n/a	NO	NO
Ga	31	YES	<5	YES	YES
Rb	37	YES	<5	YES	YES
Nb	41	YES	<5	YES	YES
Sn	50	YES	<20	YES	NO
Cs	55	YES	<20	YES	YES
Ta	73	YES	<10	YES	YES
Tl	81	YES	<5	YES	NO

CASE STUDY 1

Blind pXRF test on Poseidon Nickel's rock chip samples from Lake Johnstone returned a strong statistical correlation between laboratory assay results and the Lithium Index (opposite).

"This is an exceptional outcome giving Poseidon confidence to apply cost effect and rapid analysis techniques on site"

(POS: ASX 21st July 2016)



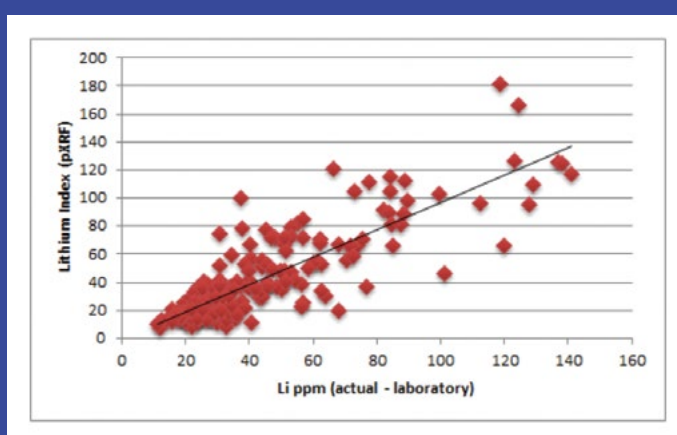
Rock chip samples laboratory analysed lithium vs Lithium Index results from the Bruker S1 TITAN.

CASE STUDY 2

Blind test conducted on -250um soil samples collected over an LCT Pegmatite prospect (PEG008) returned a strong Lithium Index correlation ($r^2 = 0.84$) when compared the laboratory results (opposite & below).

"Pioneer considers that this exploration strategy, utilising pXRF and laboratory analysis, is fit for purpose in the context of identifying potentially lithium-bearing pegmatites. In addition to being cost efficient, it ensures very rapid information turn-around"

(PIO: ASX 27th July 2016)



Soil samples laboratory analysed lithium vs Lithium Index results from the Bruker S1 TITAN.



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Detecting the Undetectable Lithium

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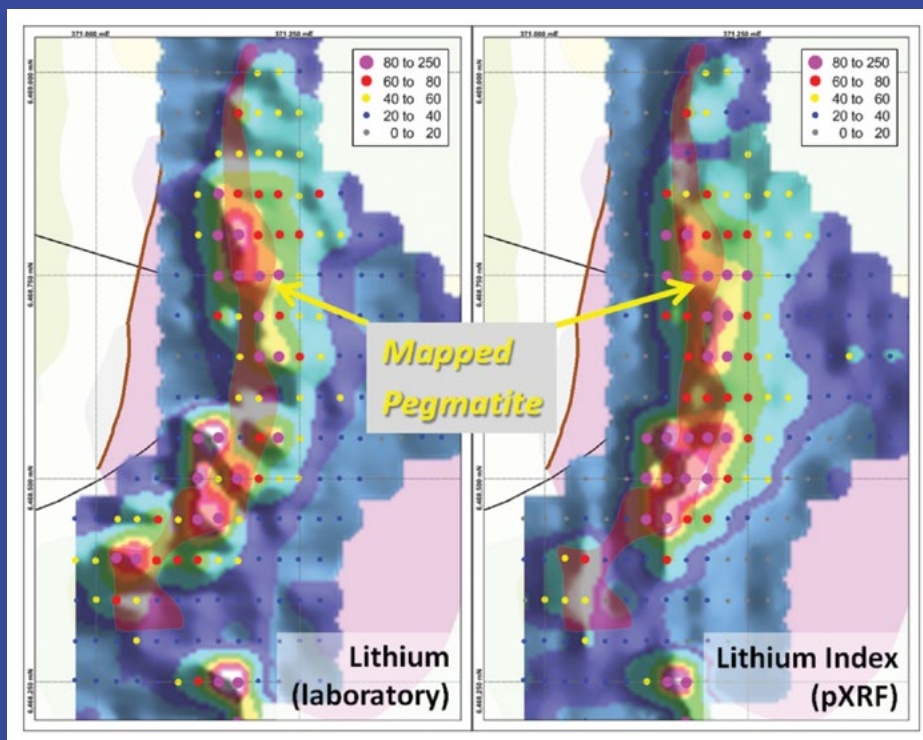



Image of lithium assays (left) and Lithium Index (right) over a mapped pegmatite.

LITHIUM INDEX CALIBRATION

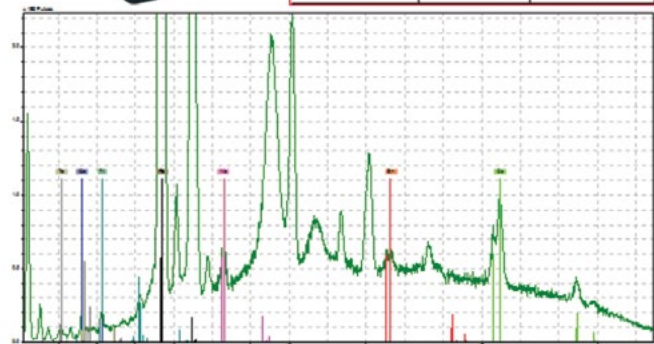
The Lithium Index Calibration has been developed by **Portable XRF Services** through the Australasian Bruker Authorised Application Centre and is available on the **Bruker S1 TITAN** portable XRF analyser.

The **Lithium Index Calibration** is optimised to detect critical elements present in LCT Pegmatites namely Ga, Rb, Nb, Sn, Cs, Ta and Tl along with elements important to evaluate the fertility of granites, the nature of the host rocks include K, Ca, Cr, Mn, Fe, Ni, Zn, Zr along with Mg, Al, Si, P, S, V, As, Sr, Mo, Sb, Pb, Bi.

The **Lithium Index Calibrations** offers a proven and tested cost effective application for exploring and exploiting LCT Pegmatites with real time results displayed on the screen.



ARC103060	Lab (ppm)	pXRF (ppm)
Cs	2389.51	2459
Ga	65.42	67
Li	11836	Cal: 9040
Nb	56.06	59
Rb	8813.8	8797
Sn	26.5	33
Ta	76.52	90
Tl	77.64	72




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