

LIBS for an application in metallogeny (geology)

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Corridor Project

The main goals of the Corridor project is to provide new insight on gold mineralisation and crustal evolution of Eastern part of the Superior Craton. This three-year project is a collaboration between the mining industry – Géologie Québec/FRONT and UQAM Montréal, with the participation of the GÉOTOP. The main objective of the Corridor Project is therefore to provide robust time constraints on gold mineralisation in the Superior Province.

Why Laser Induced Coupled Plasma Spectroscopy (LIBS) ?

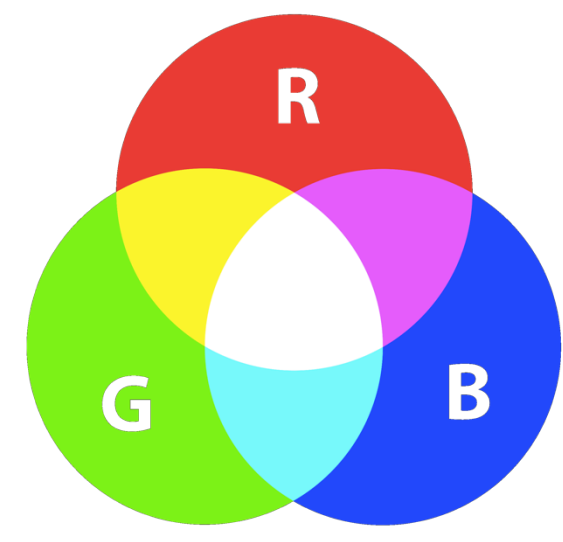
LIBS has considerable advantages on X-ray based technologies because of its capabilities in probing light chemical-elements. Thus, that allows metal-ligand mapping, a powerful metallogenic tool.

This example focuses on Boron (B) analysis, coupled with other elements : Au, Ag, Re, Ti, Fe, Cu, Si, Mg. The goal of this methodology development led by GÉOCOOP and EPITOPOS aims to understand the in-situ relationship of mineralisation's phases that were subjected to Re/Os investigations.

The LIBS System used in this study is a laboratory system (CRITT Matériaux Alsace), but an industrial system is in development and could be used in the future by companies in a field laboratory for example.

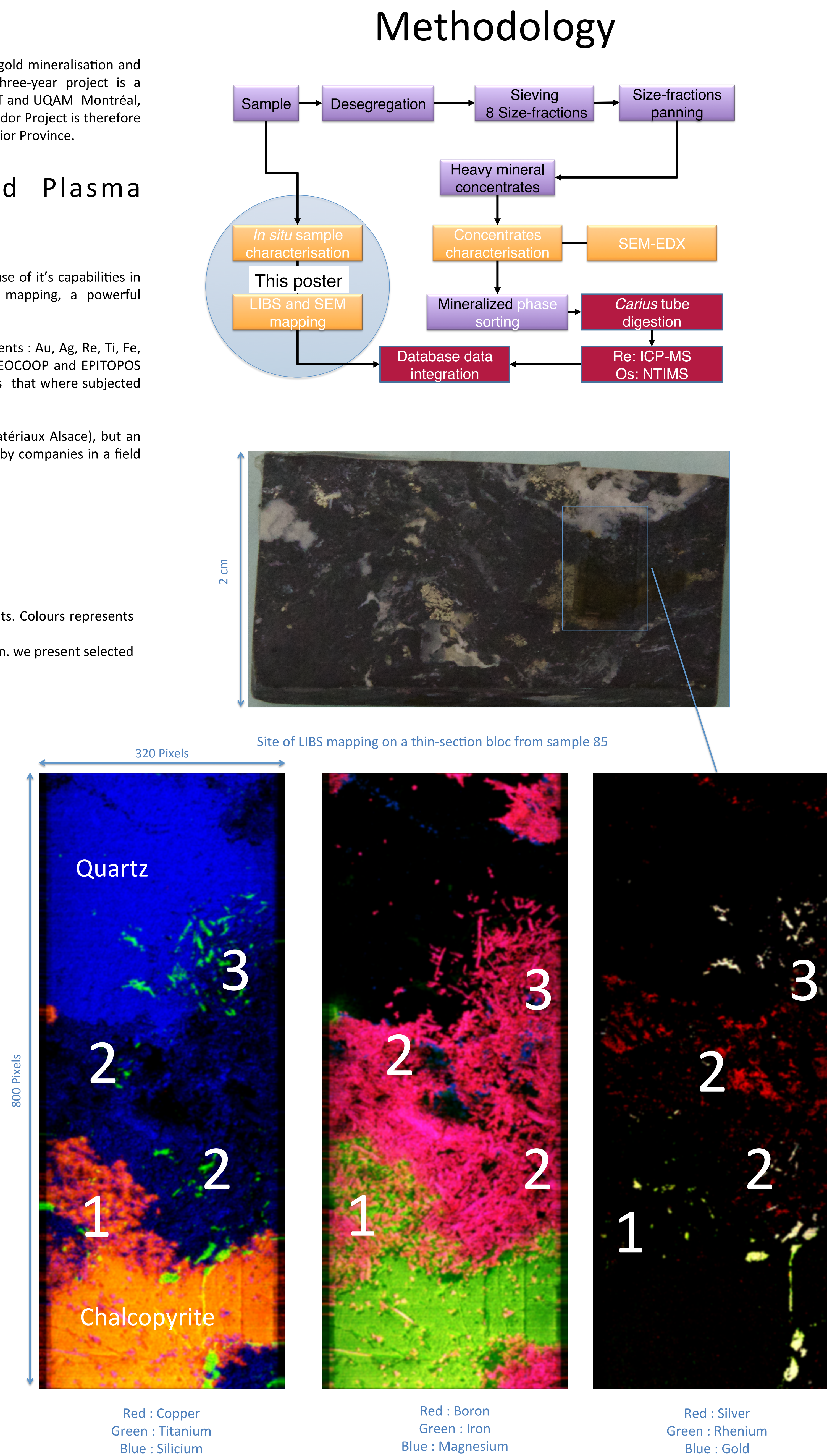
LIBS results

We used RGB additive colours model in delivering LIBS maps results. Colours represents therefore elements ratios. Each map displays 256 000 spectra. Each pixel has a 15 µm resolution. we present selected elements of interest.

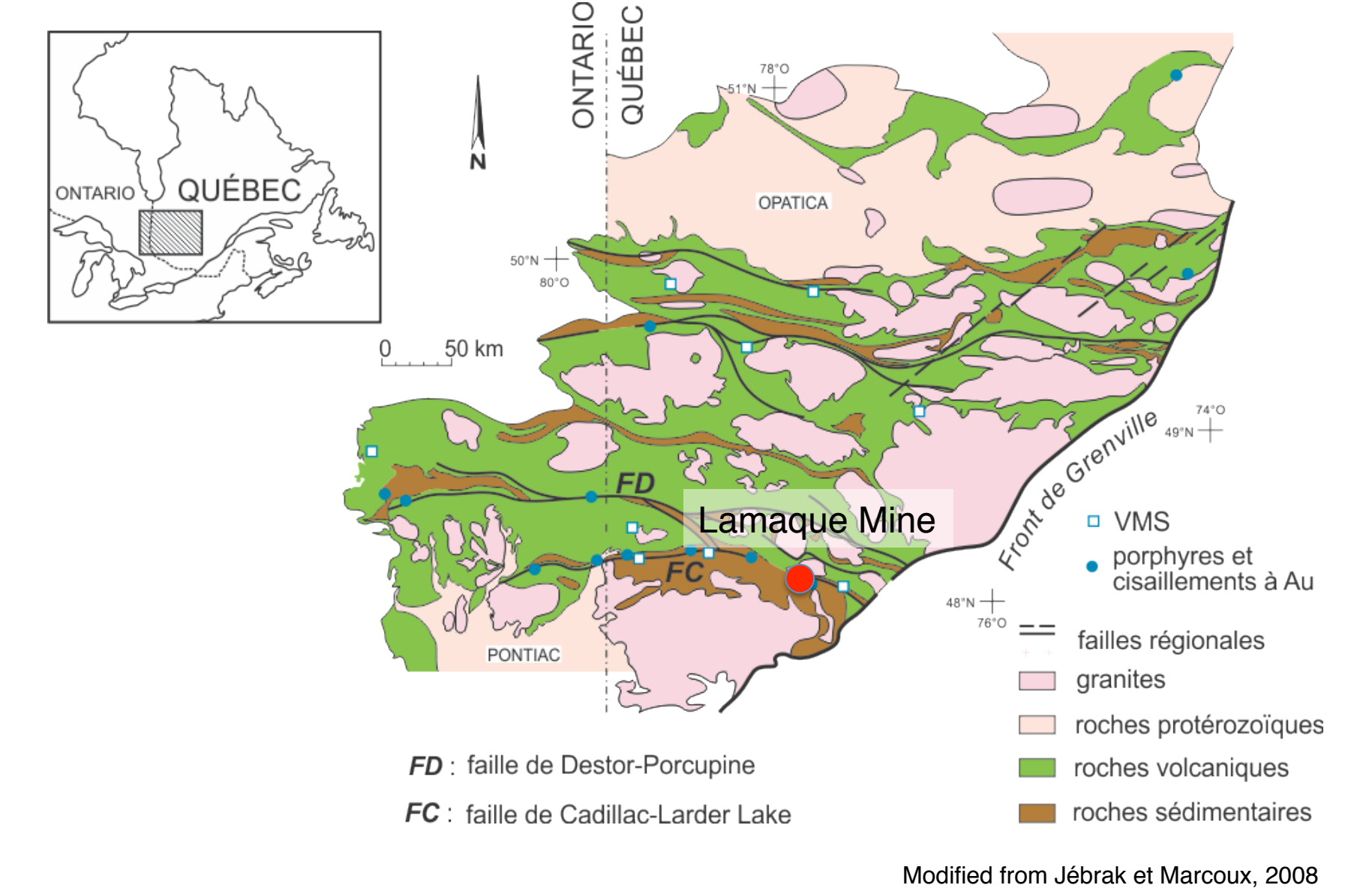


Contributions

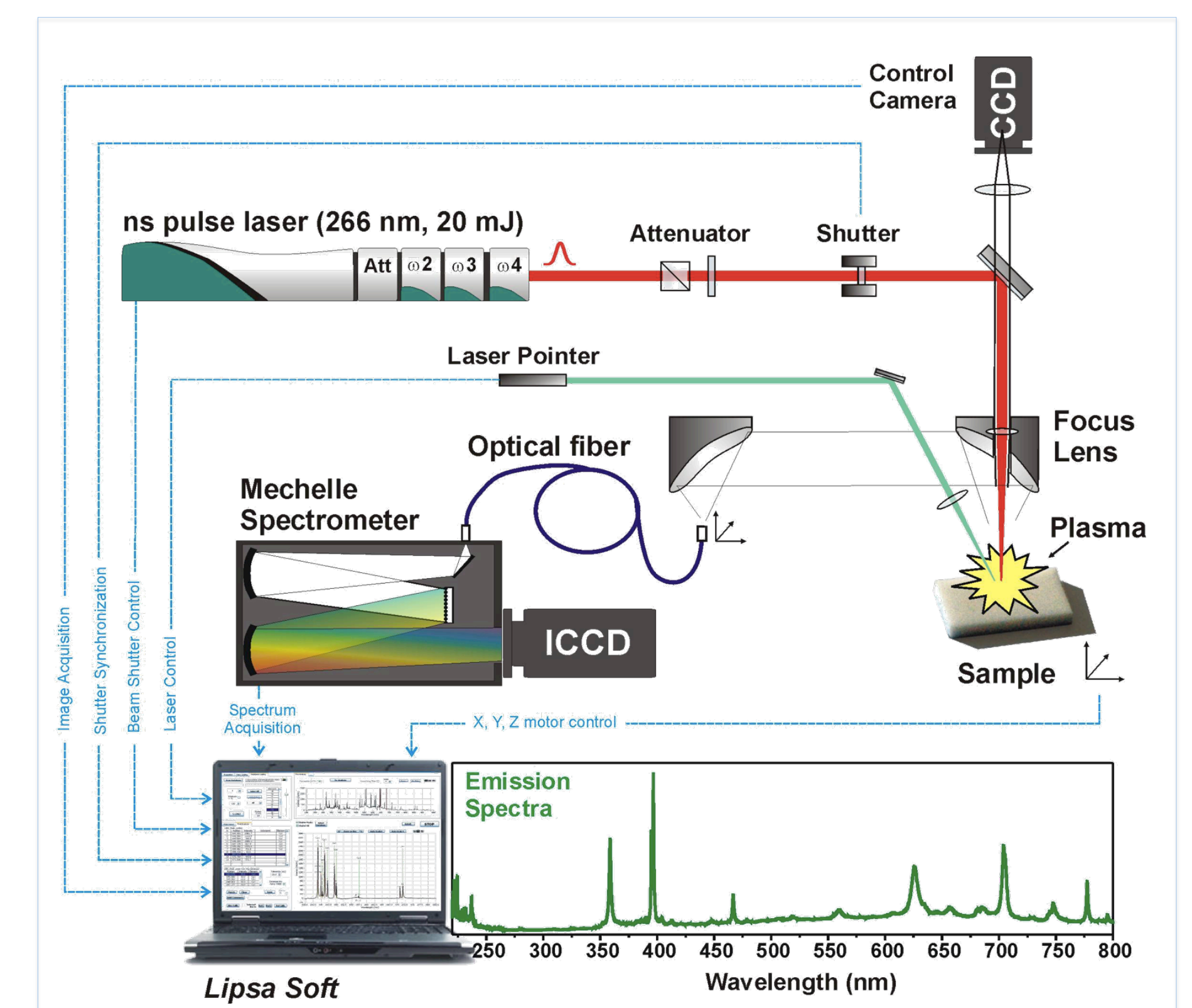
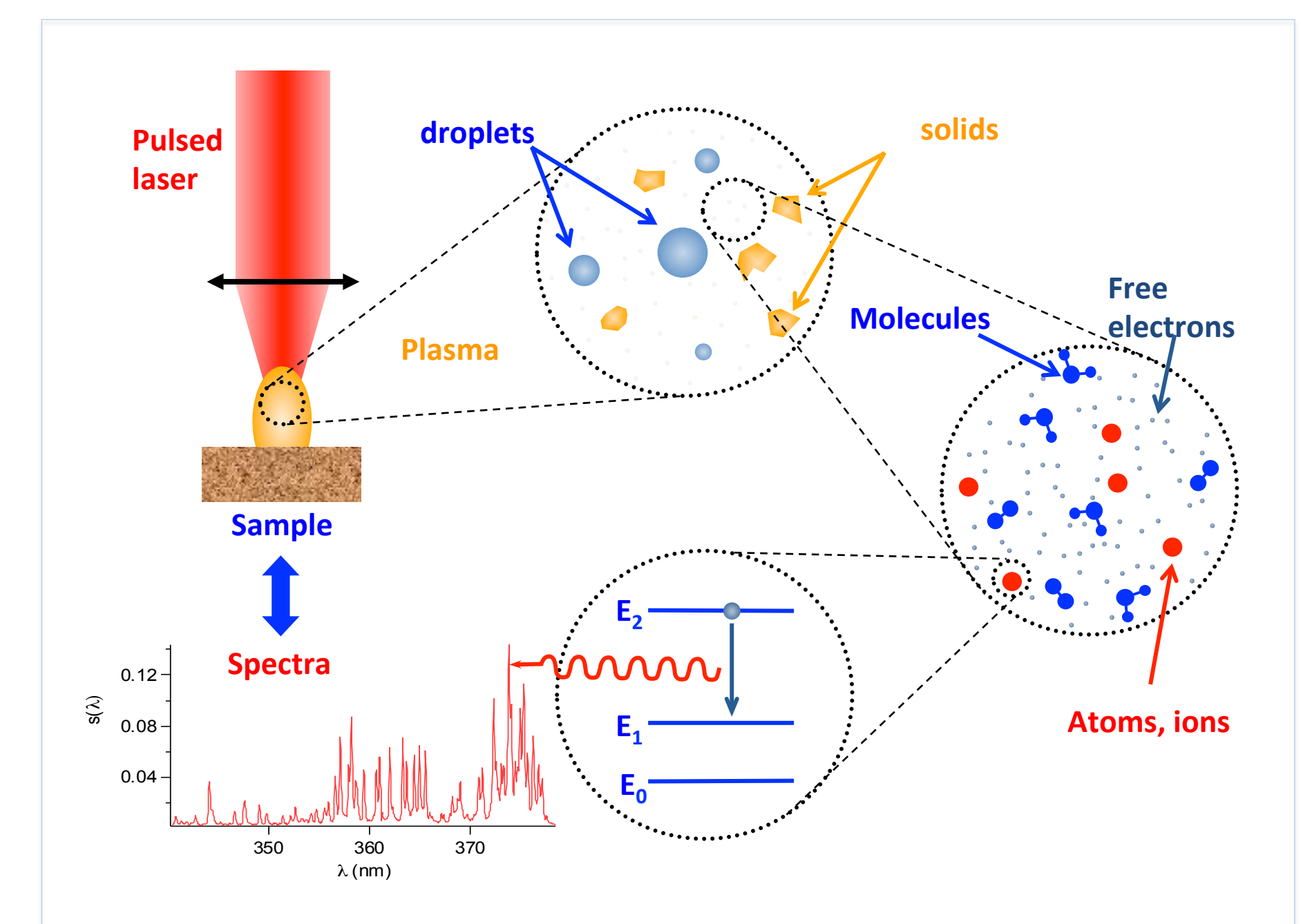
- LIBS is an efficient way to map light chemical elements like boron.
- It successfully illustrates textural and chemical relationships between the different mineral phases documented within the size fraction (Cf Dever et al. S5-P25).
- LIBS is a powerful tool in understanding gold distribution phases.
- This approach allows understanding the various sources of Re related to ore phases.



Localisation

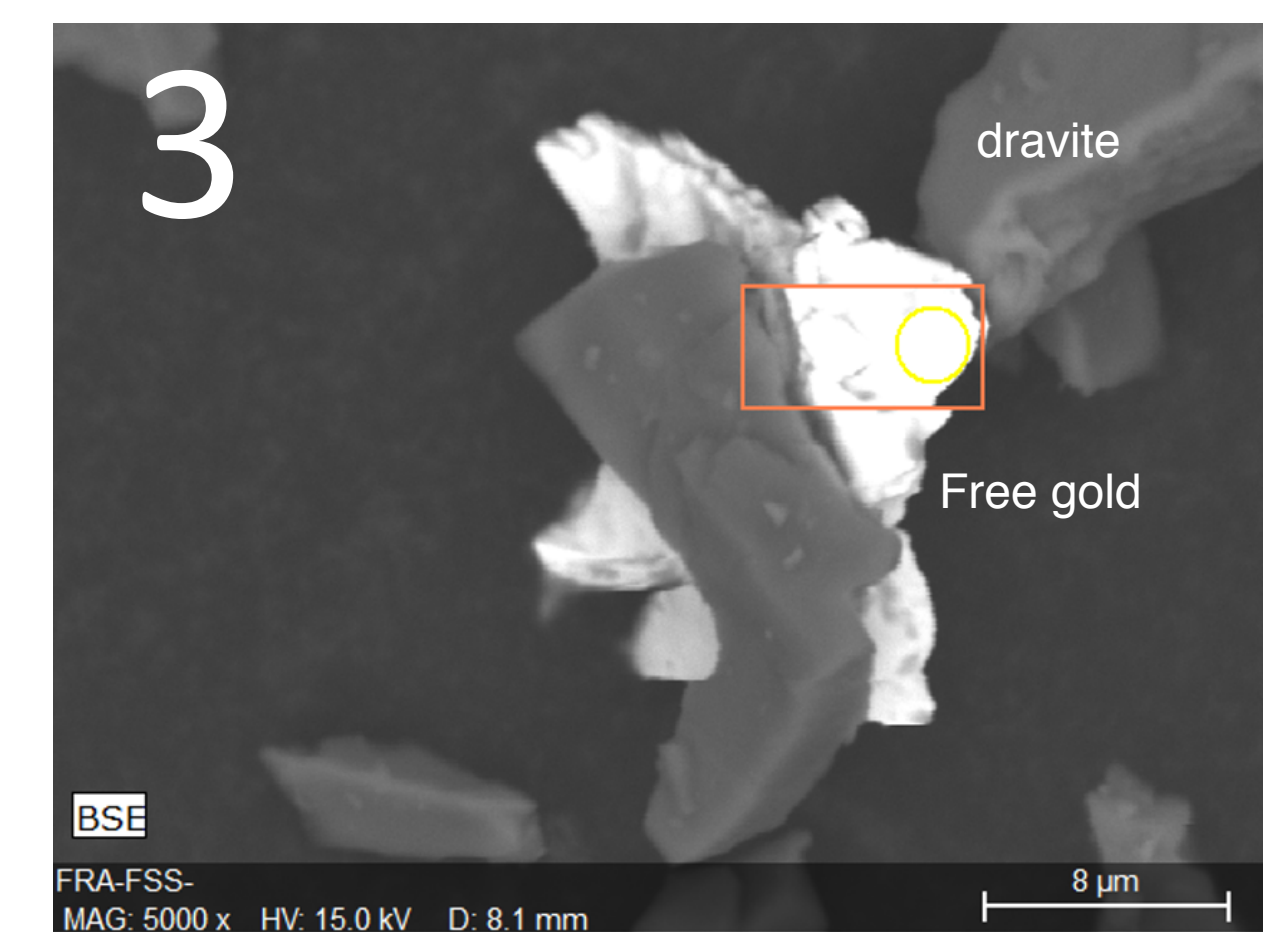
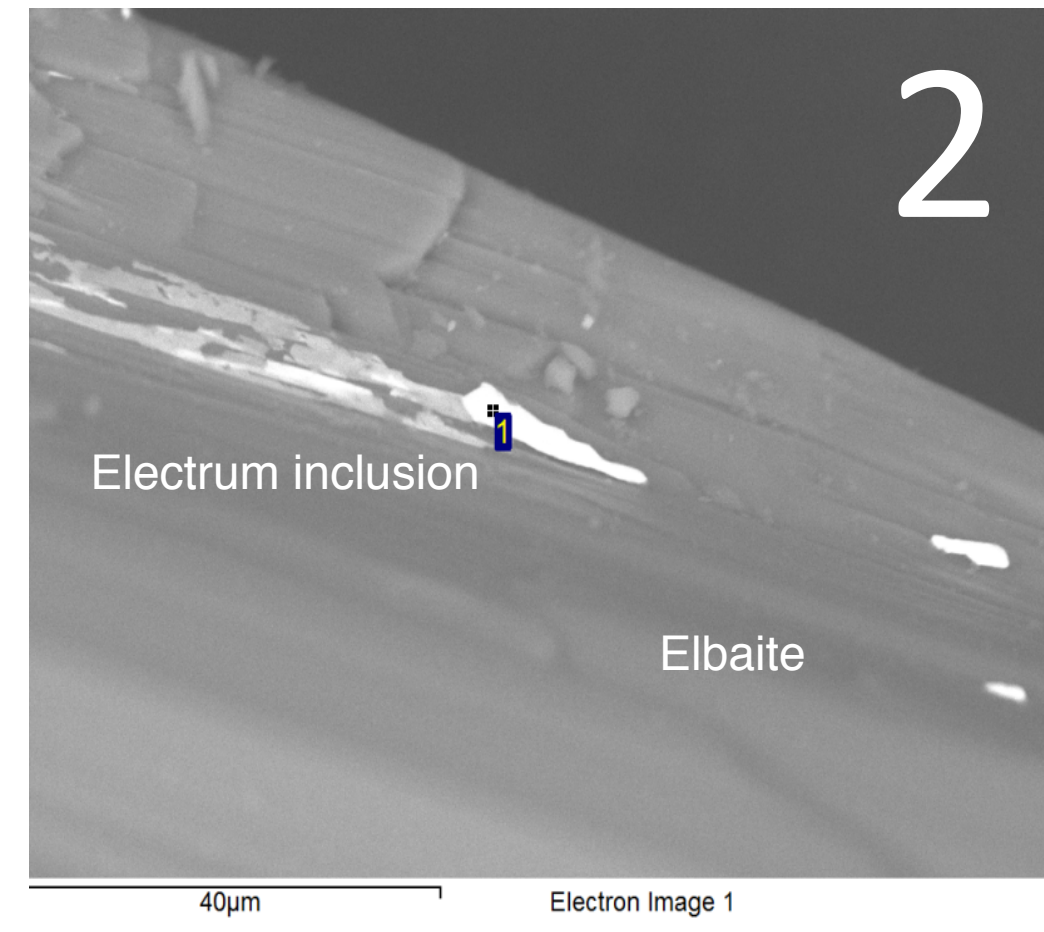
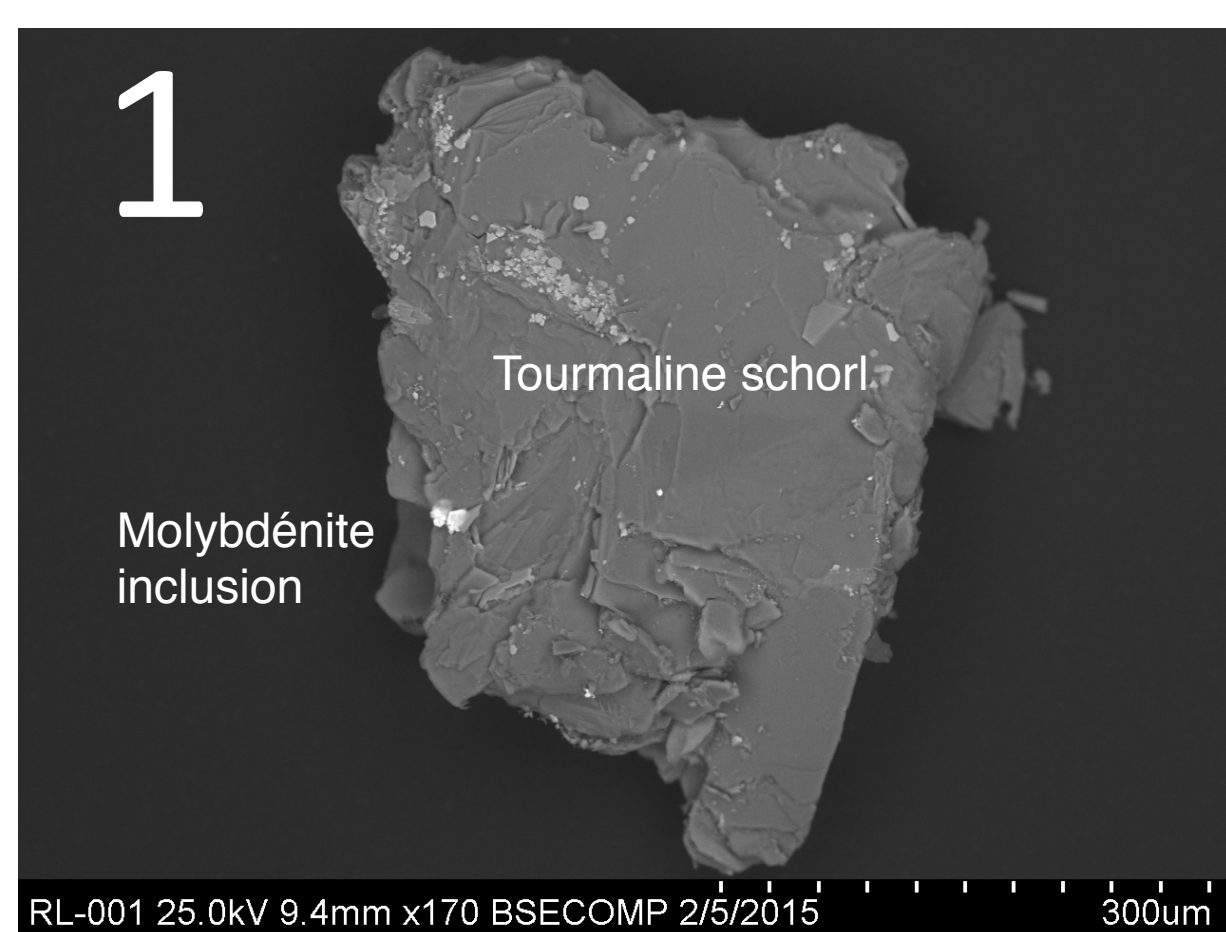


LIBS Basics



Validation – interpretation

Three types of tourmalines are detected :
 Schorls with molybdenum inclusion (1), Elbaite with electrum inclusions (2), Dravite with free gold and calaverite (3)



See also ...SGA – Nancy 2015 :

Daver L, Sasseville C. and Jébrak M. - Tourmaline-Pyrite Assemblage in Gold Mineralization of Cadillac Fault in Abitibi, Quebec

Sasseville C., Jébrak M., Stevenson R., Poirier A. – When size does matter

Acknowledgement

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