

XRF on thin sections tested on conventional and unconventional carbonates – a review of results obtained using different tools and various device settings

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Summary

A series of experiments has been performed on uncovered thin sections (THS) and on companion thin section stubs. The results are promising for any rock based work on outcrop, cores or cuttings, helping analyze rock texture together with rock and isotope composition.

XRF measurements clearly depend on the settings of the acquisition device including vacuum or no vacuum, voltage and current intensity. These settings are important when dealing with thin sections because they affect the depth of interaction volume and may focus the beam into the supporting glass plate.

For handheld XRF guns, the use of vacuum on THS is associated with improved accuracy of the measurements (better match with the stubs) especially for light elements, e.g. magnesium.

For the micro-XRF (ITRAX), the best match between THS stubs and THS for the calcium and magnesium trends are 25 kV and 55 mA. However, a combination of 25 kV and 50 mA is preferred as it delivers very consistent results for heavy elements and trace elements.

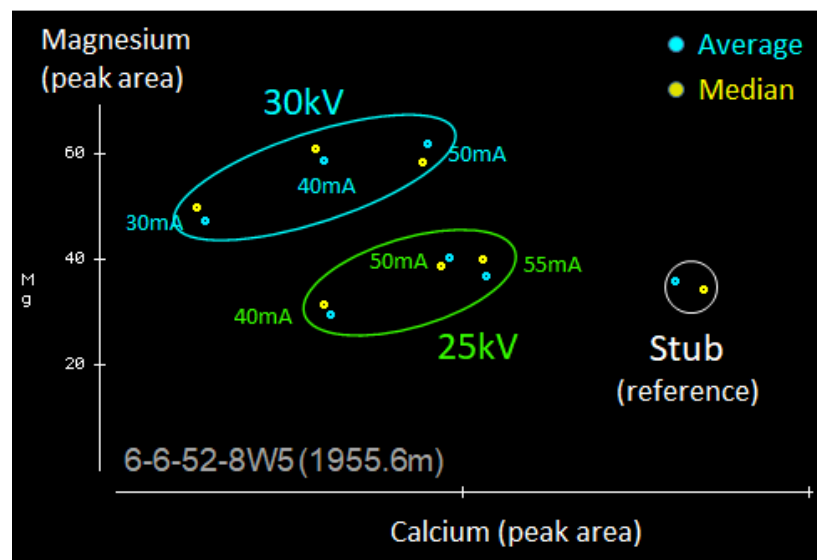


Fig.1 Variability of results using the micro-XRF with various settings on one single Banff thin section

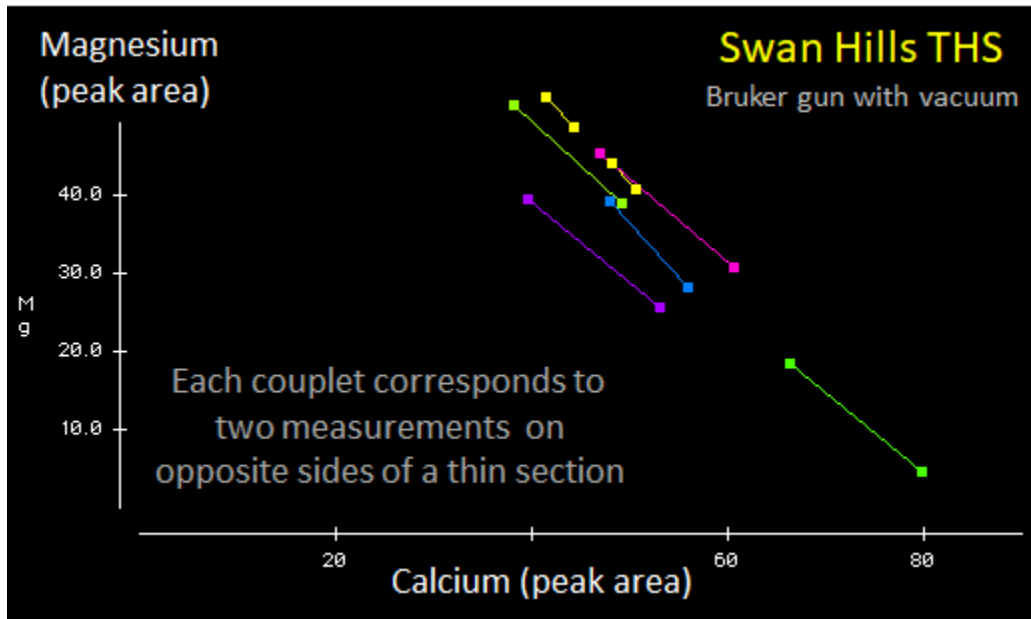


Fig. 2 Typical repetition of trends in Calcium Magnesium in Swan Hills dolomite samples giving credibility to XRF measurements on thin sections using a handheld XRF gun operating under vacuum

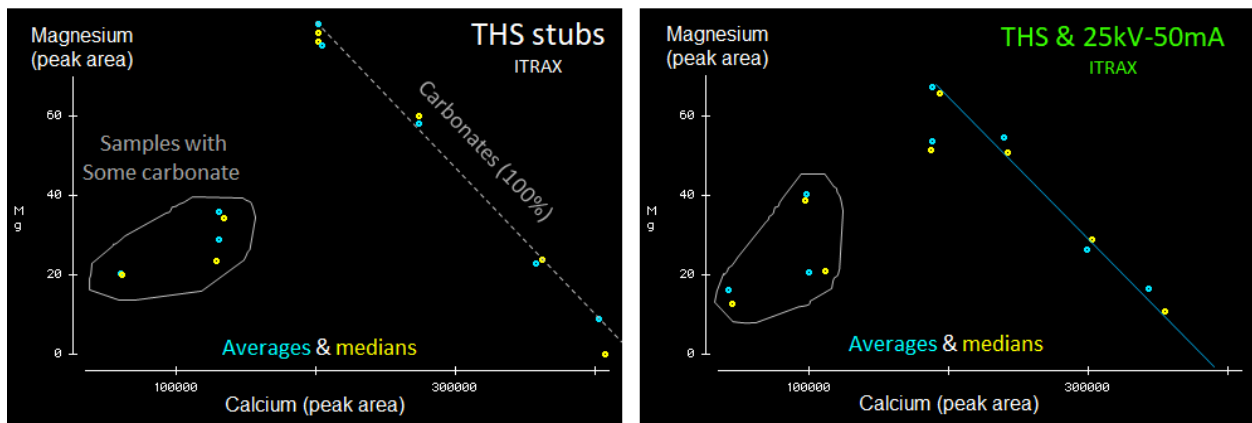


Fig.3 Calcium-Magnesium comparison between eight Banff thin section stubs and the companion thin sections with the 25kV – 50mA setting for the micro-XRF; each point represents the average or the median of more than 20 measurements along the thin sections – note a decrease in magnesium for the THS but the Ca-Mg overall trend between carbonate samples is mostly preserved.