Pattern Formation In Mississippi Valley-Type Deposits

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ABSTRACT

A rhythmic pattern which is frequently observed in the vicinity of Pb-Zn mineralization is the zebra dolomite. The structure consists of alternating dark and light dolomitic layers whereas the grain size is much larger in the light bands.

In this study, samples from the San Vicente mine in Central Peru were analyzed structurally with Petrographic- and Scanning Electron Microscopy (SEM). In addition to this, micochemical analyses were performed with Electron Microprobe (EMP), and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS).

The Petrographic microscopy and SEM revealed a high density of impurities which tend to be lined up along grain boundaries. The geometry of the grain boundaries also shows a slight variation between the dark and light regions. During the EMP analysis, no variation in chemical composition of the two dolomite generation was detectable. Only in the central part of the light bands a difference in *Fe* and *Mn* content was observable. This correlates with luminescent structures revealed by Cathodoluminescence-microscopy. High resolution trace element analysis performed with LA-ICP-MS detected variations in different element concentrations between the light and dark layers. The findings observed with the different analytical techniques form the basis of a microdynamic simulation. This simulation will help to understand the fundamental processes which lead to the pattern formation.

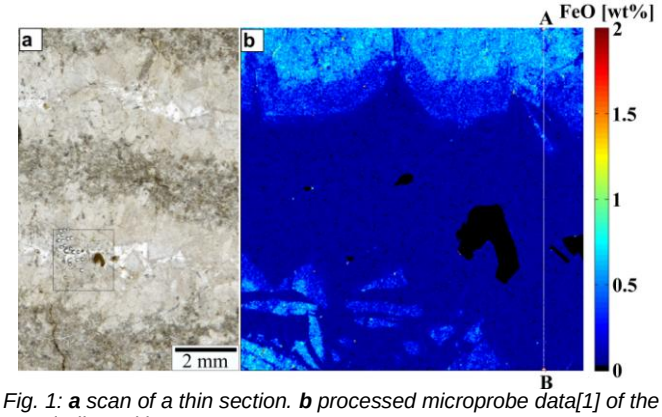

Fig. 1: ***a*** *scan of a thin section.* ***b*** *processed microprobe data[1] of the area indicated in* ***a****.*

References

1. LANARI, P. VIDAL, O., DE ANDRADE, V., DUBACQ, B., LEWIN, E., GROSCH, E., SCHWARTZ, S., XMapTools: a MATLAB©-based program for electron microprobe X-ray image processing and geothermobarometry. **Computer and Geosciences 62**, 227 – 240. (2014)