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▶ **To cite this version:**

Noémie Breillat, Catherine Guerrot, Philippe Négrel, Eric Marcoux. Delta97/95Mo variation in molybdenites : a link with mineralizing prossesses ?. 10th Applied Isotope Geochemistry Conference, Sep 2013, Budapest, Hungary. hal-00835823

HAL Id: hal-00835823

https://brgm.hal.science/hal-00835823

Submitted on 19 Jun 2013

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$\delta^{97/95}$Mo VARIATION IN MOLYBDENITES: A LINK WITH MINERALIZING PROCESSES?

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Molybdenum (Mo) isotopic compositions are usually studied to reconstruct (paleo-) redox conditions in ocean (e.g., Siebert *et al.*, 2003). Some studies also focus on isotopic compositions of Mo in molybdenite in order to decipher a possible genetic link between isotopic variations and mineralizing processes. This is also the aim of our work based on a wide molybdenite databank. We propose here a comparison of $\delta^{97/95}$Mo of 101 molybdenite samples from different localities, different types of occurrences and different ages. This databank of 101 molybdenites, presently analyzed, represents various types of mineralization as samples from 5 skarns, 7 porphyry deposits, 9 pegmatites, 5 granites, 2 greisens, 7 perigranitic veins and 9 alpine-type fissure veins have been studied. Molybdenite sample ages vary from 5Ma to 2.7Ga.

The Mo isotopic composition has been determined on molybdenites using a MC-ICP-MS Neptune after *aqua regia* dissolution and adjustment to [Mo] = 1µg.g^{-1}. Mass bias was corrected by using Zr as dopant and standard-sample-standard bracketing. The $\delta^{97/95}$Mo ratios have been normalized to NIST 3134. The external reproducibility is 0.07‰ (2σ).

The overall range of the $\delta^{97/95}$Mo ratio in the 101 molybdenite samples varies from -0.58 to 0.89‰. The $\delta^{97/95}$Mo ratio is higher for the molybdenites formed in alpine-type fissure veins, greisens and perigranitic veins than for the molybdenites issued from granites, pegmatites, porphyry deposits and skarns.

The crystallization temperature can explain this difference as alpine-type fissure veins, greisens and perigranitic veins crystallize at lower temperatures than the other types of deposits. For some occurrences, the $\delta^{97/95}$Mo has been performed on several molybdenite samples and variability at occurrence scale has been observed. For example, in Azegour skarn (Morocco), the $\delta^{97/95}$Mo varies from -0.40 to 0.32‰ (n= 29) and in "Ravin de la Ruine" alpine-type fissure veins (France) from -0.08 to 0.77‰ (n=3). As noted by Hannah *et al.* (2007), no correlations appear between $\delta^{97/95}$Mo and age of the deposits. Further Re-Os dating, Pb and S isotopic compositions in particular deposits (e.g. Azegour skarn) will help to decipher the origins of these variations.

References

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