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Trace element chemistry and geochronology of molybdenites from different types of mineralization in the Bohemian Massif: Results from LA-ICPMS and Re-Os studies

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Laser Ablation Inductively Coupled Mass Spectrometry (LA–ICPMS) spot analysis and mapping have been successfully used to document and interpret trends of trace element distribution in different types of sulfides ([1], [2], [3] and others). As an important carrier of Re, molybdenite (MoS_2) is a useful mineral in Re–Os geochronology ([4] and others). We show from the example of four different types of associations from the Bohemian Massif (greisen-, gold-, base metal-, and "barren granite"-related) and of one porphyry-Cu-Mo(Au) deposit from Uzbekistan, that besides typically lattice-bound elements (Re and W) and isostructural concentrations of Se and Te (substituting for S), molybdenite can concentrate other metals (e.g., Ag, As, Au, Bi, Cu, Nb, Pb, Zn, Zr) which mostly form impurities [5]. Typical lattice-bound elements (W, Se, Te) can locally occur as impurities or micro-inclusions.

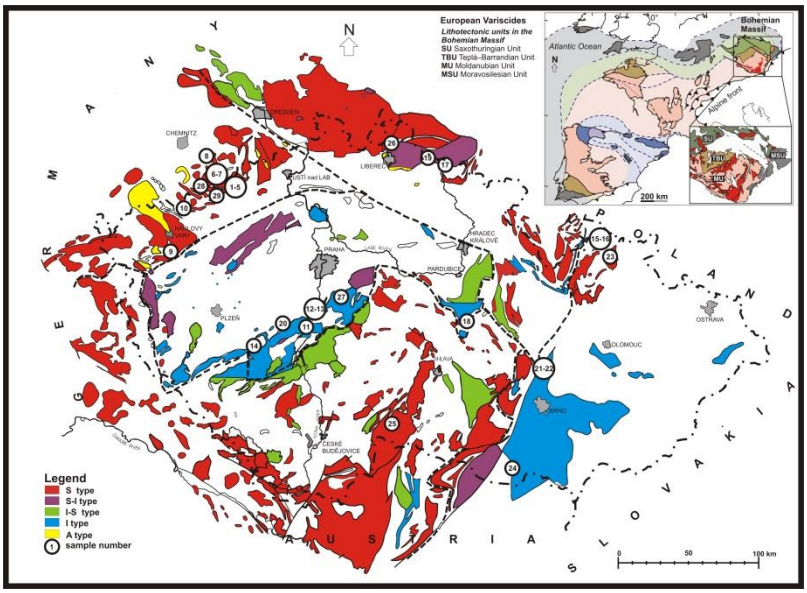

Figure 1: Location of the studied molybdenite samples in I-A-S type granitoids/orthogneisses in the Bohemian Massif [5].

The distribution of Re in molybdenite indicates crustal sources for the group of greisen-, base-metal-, and a few of the granite-related deposits, compared to a mixed mantle/crustal source for the Au-related and majority of granite-related deposits [5].

We also present new Re-Os data for most of the studied molybdenites. They show variable ages (~597-302 Ma). These ages are similar to (Hůrky u Rakovníka, Derflice, Kozí Hora) and/or slightly lower than (Padrť) U-Pb and/or Pb-Pb zircon ages of associated granites suggesting (semi)contemporaneous magmatism and Mo-mineralization.

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References:

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