THERMODYNAMIC CONSTRAINTS OF TUNGSTEN TRANSPORT AND WOLFRAMITE PRECIPITATION IN HIGH-TEMPERATURE HYDROTHERMAL FLUIDS

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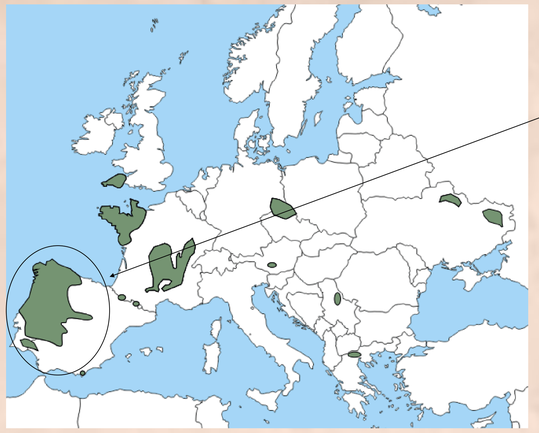
1. Studied Area



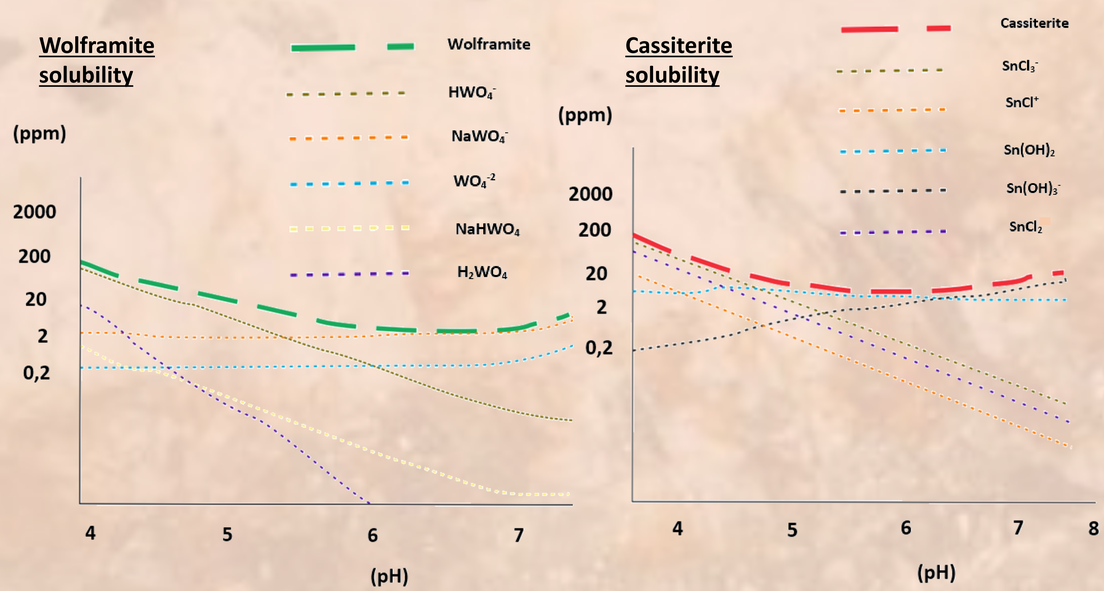
Regions with Sn-W deposits in Europe

Sn-W-(Ta-Li) deposits from the Iberian Variscan Massif form a rather genetically homogeneous group of deposits that are related to mesozonal and epizonal felsic magmatism in thickened continental crust.
Mineralization mainly occurs in pegmatites, porphyry-like mineralization, altered cupolas, skarns, and sheeted vein systems.

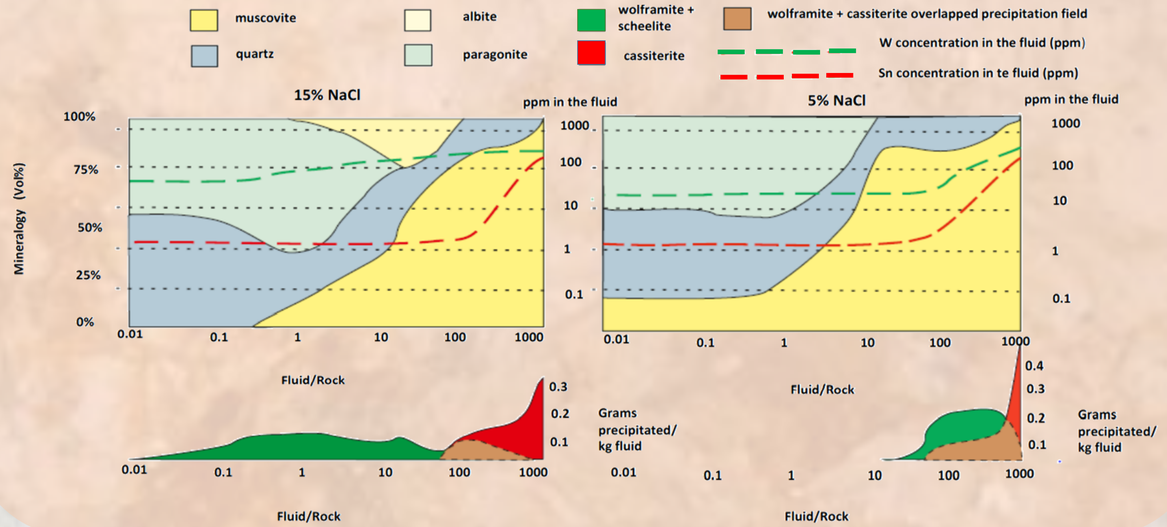
2. Thermodynamic model

- The main goal of this work is to calculate wolframite and cassiterite solubilities during the interaction of acid hydrothermal fluids with pelitic and granitic rocks.
- The composition and conditions of the initial fluid was estimated considering fluid inclusion analysis, stable isotopes and element partitioning between final granite melts and exovled high temperature magmatic hydrothermal fluids reequilibrated with magmatic minerals (Heinrich, 1990; Wood and Samson, 2000)
- A simplified H-O-Cl-Na-K-Fe-Si-Al-Sn-W-bearing ore fluid at 300ºC, 500 bars, 5-15% wt. NaCl and log fO2 between QFM and NNO buffers has been estimated.
- SOLVEQ/CHIM software from Reed et al., (2010) was used for all the calculations presented in this work.

3. Sn and W solubility in the initial hydrothermal fluid



4. Reaction of the initial hydrothermal fluid with schist



5 . Conclusions

- The interaction of acid hydrothermal fluids with pelitic rocks triggers early cassiterite precipitation.
- Higher rock/fluid ratios are needed to precipitate tungsten from acid hydrothermal fluids. Other mechanisms like cooling have a higher effect on wolframite precipitation

6 . References

- Heinrich, C. A. (1990). The chemistry of hydrothermal tin (-tungsten) ore deposition. *Economic Geology*, *85*(3), 457-481.
- Reed, M. H., Spycher, N. F., & Palandri, J. (2010). SOLVEQ-XPT: a computer program for computing aqueous-mineral-gas equilibria. *University of Oregon, Department of Geological Sciences, Eugene*, *43*.
- Wood, S. A., & Samson, I. M. (2000). The hydrothermal geochemistry of tungsten in granitoid environments: I. Relative solubilities of ferberite and scheelite as a function of T, P, pH, and m NaCl. *Economic Geology*, *95*(1), 143-182.

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iTarg3T Innovative Targeting & processing of Tin, Tungsten and Tantalum ores

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