Geochemical modelling of Sn and W in granites from Central Iberian Zone (Spain)

CASILDA RUIZ [1]*AND CONCEPCIÓN FERNÁNDEZ-LEYVA[2]

[1]Technical University of Madrid (UPM). Spain (*correspondence: casilda.ruiz@upm.es)
[2]Geological Survey of Spain. Madrid 28003 (c.fernandez@igme.es)

Field and petrographic observations of the quartz veins mineralization in relation with granites in Central Iberian Zone (CIZ) [1], show that cassiterite and wolframite occur in quartz veins principally. It seems that quartz deposition is before the cassiterite one and wolframite is deposited after cassiterite. Processes that form mineral deposits associated with granitic rocks can have a close relationship with magmatic processes. Geochemical calculations applied to Sn and W have been performed to investigate if magmatic processes have been the mechanism by which the mineralisation was generated in the (CIZ).

Complex linear mixing models show that Sn and W increase their concentration in the fractionation stages while modal extracted muscovite is reduced. Sn and W are concentrated in the residual liquid when the modal quantity of extracted muscovite is $\leq 5\%$. Starting from an initial leucogranitic composition, concentrations of Sn can reach up values over 100 ppm after high degrees of fractionation. On the other hand, the calculated W concentrations are much lower. The same results suggest models for equilibrium and fractional crystallisation [2]. Complex linear mixing models show that crystallisation processes generated mineralizations by concentrations of Sn, whereas W does not reach the levels required for generating ones.

[1] Ruiz *et al.* (2008). *Chem. Erde,* **68**-4, 337-450. [2] Fernández-Leyva *et al.* (2009). *Geochim. Cosmochim. Act,* **73**, 13S, A368-A368.

The pH influence on barite nucleation and growth

CRISTINA RUIZ-AGUDO[1], CHRISTINE PUTNIS [2]
AND ANDREW PUTNIS [3]

[1]c_ruiz02@uni-muenster.de
[2]putnisc@uni-muenster.de
[3]putnis@uni-muenster.de

Barite ($BaSO_4$) scale formation is a problem in many industrial processes, especially in oilfields where mixing sea water with reservoir water can result in solid layers of barite scale that can completely block pipes. Organic compounds (e.g. organophosphonates) have been used as inhibitors for barite precipitation. The effectiveness of these compounds is pH-dependent, usually more effective at high pH where they are highly deprotonated. Thus to be able to determine the performance of organic additives as barite scale inhibitors, we have first studied the influence of pH on barite nucleation and growth.

To determine the influence of pH on growth, AFM observations of barite growth on a barite cleavage surface were carried out under conditions of constant supersaturation, temperature, Ba/SO_4 ratio and ionic strength but changing growth solution pH.

The effect of pH on nucleation was studied with turbidimetry and conductivity experiments complemented with FESEM observations to determine changes in morphology and size of the barite precipitated. Induction times were determined by monitoring the variation in absorbance due to barite precipitation and this enabled the estimation of potential changes in interfacial tension. Conductivity experiments allowed us to determine the onset of nucleation (i.e. induction time) as well as the supersaturation reached at that point and how both parameters vary with pH.

It was found that increasing the pH of the growth solution results in shorter induction times and lower values of interfacial tension. These changes can be explained considering the effect of increasing hydroxyl ion concentration on barium hydration.

DOI:10.1180/minmag.2013.077.5.18