Insights into hydrothermal fluids from Li-mica compositions(Maoping W-Sn deposit, Jiangxi, China)

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Lithium-bearing micas are known to be good recorders of magmatic fractionation, especially within granites and pegmatites. However, their potential as tracers of hydrothermal fluids in poorly constrained. The Maoping W-Sn deposit (Jiangxi, China) offers the possibility to investigate the composition of both magmatic and hydrothermal Li-micas along successive stages of the emplacement of the peraluminous granite, magmatic/hydrothermal transition and hydrothermal W-Sn mineralization, with: (i) magmatic Li-micas from feldspar veins associated to the late crystallization of the peraluminous melt, (ii) hydrothermal Fe-Li mica veins , (iii) Fe-Li micas associated to W-Sn veins, (iv) oscillatory zoned Fe-Li micas from banded quartz veins and (v) Li-muscovite from the late stages and micas associated alteration associated to a pulse crystallizing REE-F-rich minerals. Based on (i) mineral assemblages at each stage, (ii) oscillatory variation in major elements and trace element concentrations in the micas, we conclude that the W-Sn mineralization is associated with a magmatic fluid deriving from a peraluminous magma mixed with a metamorphic fluid equilibrated with surrounding rocks. The composition of the micas from the banded quartz veins imply a hidden (but identified regionaly) peralkaline REE-rich magmatic source of fluids mixed with hydrothermal fluids of meteoric origin. The possible involvement of both peraluminous and peralkaline intrusives suggests a polyphased magmatic-hydrothermal system at the Maoping deposit with a W-Sn enrichment occurring in the Early Yanshanian and a REE pulse probably occurring in the Late Yanshanian.