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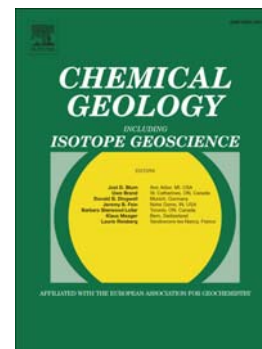
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## Evidence for Aqueous Liquid-Liquid Immiscibility in Highly Evolved Tin-Bearing Granites, Mount Pleasant, New Brunswick, Canada

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### Abstract

Three distinct types of fluid inclusions (i.e., liquid + vapor (LV), liquid + vapor + solid (LVS), and V-only) co-exist within a single, primary fluid inclusion assemblage in fluorite crystals that formed prior to and in close association with cassiterite mineralization in an assemblage comprising fluorite + arsenopyrite + topaz + cassiterite in the Sn (-W-Mo) deposit of the North Zone, Mount Pleasant, New Brunswick. The mineral assemblage occurs in vugs, with late quartz and chlorite filling the remainder of the open space. Solid-bearing inclusions contain up to eight, optically different solids, which are estimated to occupy up to approximately 70 vol. % of the fluid inclusions. In a given fluid inclusion assemblage, each type of fluid inclusion shows consistent L-V or L-V-S phase ratios.

The results of microthermometric analyses show that LV inclusions have low salinities that vary from 0 to 10 wt. % NaCl eq., and homogenization temperatures that vary from 91 to 250 °C. Within a given assemblage, the ranges of salinity and homogenization temperatures of LV inclusions are even less. In contrast, co-existing LVS inclusions are highly saline, with salinities ranging from 36 to 40 wt. % NaCl eq., and have much higher homogenization temperatures that vary from 425 °C to > 600 °C (the upper limit of the microthermometric stage). The salinity and homogenization temperature ranges of LVS inclusions show a limited range for a given assemblage. The solids in LVS inclusions are interpreted as daughter phases due to consistent phase ratios in LVS fluid inclusions and because, during heating experiments, all solid phases melted prior to liquid-vapor homogenization. The consistency of phase ratios and the results of microthermometric analysis among LV or among LVS inclusions show that these inclusions were not formed through necking down of larger inclusions. In addition, the absence of 'sweat halos' and re-entrants rules out water loss as a possible mechanism for producing these coexisting fluid inclusions. Fluid inclusions of highly contrasting salinities and homogenization temperatures are, therefore, interpreted to be the result of trapping from two, immiscible, aqueous liquids. It is unknown whether the two liquids exsolved from one single, aqueous fluid or have different origins, but consideration of the nature of inclusion assemblages in samples from other parts of the system, suggest the latter. Topaz and cassiterite within the same mineral assemblage, as well as

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