# The source-granite-pegmatite connection through mica behaviour from crustal melting to crystallisation.

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Pegmatites have been traditionnaly considered as the result of a strong fractionation of a granitic magma. Yet, pegmatite fields are not systematically found at a close distance of granitic bodies. Following this observation, an alternative model suggests that pegmatitic magma may be produced by low degree of partial melting of an enriched source.

Mica holds great interest as a mineralogical indicator particularly in granitic and pegmatitic systems. Micas are ubiquitous as they play an important role during melting of cruystal sources and are present in both granite and pegmatite. Micas also consititute important repositories for major, trace and minor elements that do not enter into quartz and feldpars. In that sense micas coomposition constitute an interesting tool to unravel the connection between source granite and pegmatite. In order to do so, the partitioning between micas and melt during partial melting and during magma crystallisation needs to be constrained. Using experimental approaches we constrained the behaviour of trace elements in micas, mostly focusing on the behaviour of Li, from source melting to crystallising magma.

Partial melting experiments have been performed using muscovite rich (orthogneiss) and biotite-rich (paragneiss) sources at temperatures between 750 and 900 °C under both fluid-absent and fluid-present conditions for varying $X(H_2O)$ ($H_2O/(H_2O+CO_2)$) and under controlled $f(O_2)$. Crystallisation experiments have been lead using two starting materials: a two-mica leucogranite and a Li-rich leucogranite; crystallisation temperatures ranged between 620 and 700 °C under variable $f(O_2)$ and variable $X(H_2O)$.

Experimental products have been analysed and compared to a natural example of granite and pegmatite: the St Sylvestre leucogranitic Complex which is the host of the Mont d'Ambazac pegmatite field in the Western French Massif Central. Results show that highest concentration observed in pegmatite can hardly be obtained from fractionation of a granitic magma. A particularly enriched source seems required as well as a low degree of partial melting.