

**PHASE RELATIONS OF REE MINERALS FLORENCITE, ALLANITE AND
MONAZITE IN QUARTZITIC GARNET KYANITE SCHIST OF ECLOGITE ZONE,
TAUERN WINDOW, AUSTRIA**

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All three REE phases are present in quartzitic garnet kyanite schist of the Eclogite Zone, Tauern Window with peak conditions around 570-600°C, 20-25kbar. Florencite (REE)Al₃(PO₄)₂(OH)₆ inclusions are mostly in garnet rim region and kyanite but also in the muscovite-quartz matrix breaking down to monazite symplectite. Allanite (REE,Ca)(Fe,Mg)Al₂(SiO₄)₃(OH) is mostly present in garnet core but not in kyanite and matrix. This suggests florencite stability at higher P-T values than allanite. Pseudo-sections with bulk composition including Ce and La reveal florencite stability from low to higher P-T, however the present stability relations are only an estimate due to insufficient thermodynamic data for florencite and allanite. Higher Ca in bulk composition remarkable extends allanite and decrease florencite stability at higher T, but changes of Fe and Al are of minor resp. neglectable effect. Fractional garnet crystallization with more complex changes in bulk composition has a strong influence and extends florencite stability to path dependent lower P-T positions. The retrograde P-T path was calculated with a bulk composition dominated by matrix. Despite the large difference in bulk composition, e.g. Fe and Ca, the pseudo-section is partly similar than the prograde result. Compared with florencite, stability of allanite is remarkable reduced at retrograde conditions. Results of calculations with formation of allanite and later florencite growth at higher P-T followed by florencite breakdown at retrograde conditions are in accord with petrographic observations. For the present sample florencite stability is mainly due to the low Ca-content in bulk composition.