

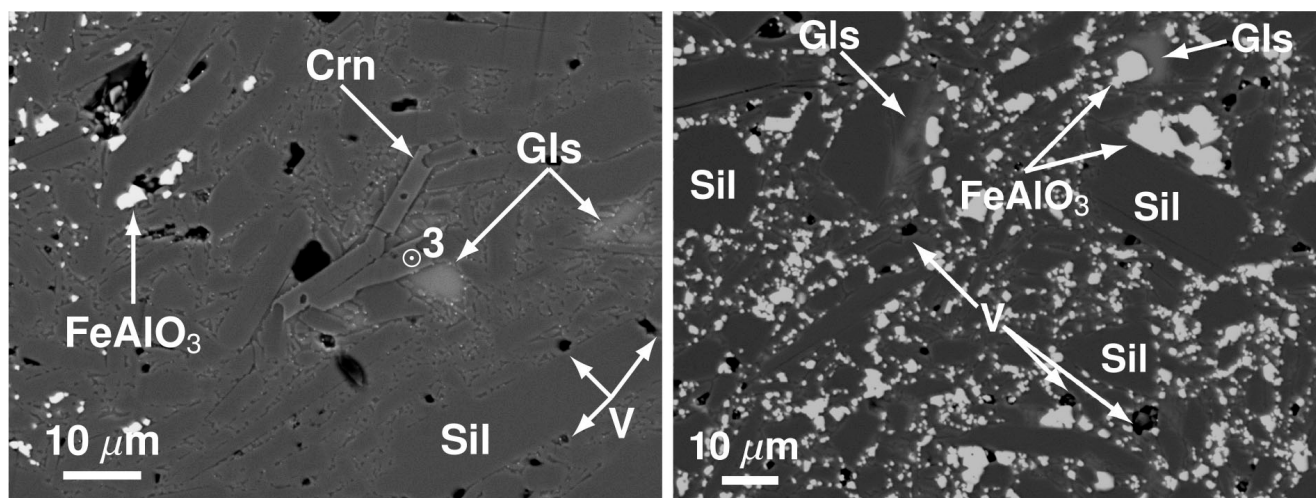
## FeAlO<sub>3</sub> phase at ultrahigh-temperature metamorphic conditions: Evidences from the sillimanite—Fe<sub>2</sub>O<sub>3</sub> and sillimanite—Fe<sub>3</sub>O<sub>4</sub> systems at 9 kbar and 1050 °C

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Two high pressure experiments at 9 kbar and 1050 °C under moisture condition reveal FeAlO<sub>3</sub> phase is stable under ultrahigh-temperature metamorphic conditions. FeAlO<sub>3</sub> and corundum newly crystallised accompanying SiO<sub>2</sub>-rich melt and vapour among sillimanite crystals from the mixture of Rundvågshetta sillimanite and reagent-grade Fe<sub>2</sub>O<sub>3</sub> (weight ratio of 95:5) within Pt capsule. We found no hematite in the charge. In contrast, we found FeAlO<sub>3</sub> phase, SiO<sub>2</sub>-rich melt and vapour among sillimanite from the mixture of Rundvågshetta sillimanite and reagent-grade Fe<sub>3</sub>O<sub>4</sub> at (weight ratio of 86:14) within AuPd capsule. We found a domain composed by FeAlO<sub>3</sub>, corundum, magnetite—hercynite spinel and ulvöspinel at the bottom part of the charge. The domain was contact with melt among sillimanite. The present results suggest the possibility that FeAlO<sub>3</sub> phase would be an index mineral of ultrahigh-temperature metamorphism for the partially melted Fe—Al-rich granulites under hydrous and oxidised environments.

Keywords: FeAlO<sub>3</sub> phase, sillimanite, corundum, spinel, ultrahigh-temperature granulites



**Fig. 1.** Backscattered electron image (BSEI) of run products recrystallised from the mixture of Rundvågshetta sillimanite and Fe<sub>2</sub>O<sub>3</sub> in the Pt capsule (left: run no. 171018A) and the mixture of Rundvågshetta sillimanite and Fe<sub>3</sub>O<sub>4</sub> in the AuPd capsule (right: run no. 171018D) at 9 kbar 1050 °C under moisture condition. Left: euhedral corundum with fine vapour hole, FeAlO<sub>3</sub> phase, glass and vapour (dark holes) fill among sillimanite crystals. Number 3 is the analysed point by Raman spectroscopy. Right: euhedral 5–10 μm size FeAlO<sub>3</sub> phase and fine (<1 μm) FeAlO<sub>3</sub> phase are scattered among sillimanite crystals accompanying melt and vapour (dark hole). Crn, corundum. FeAlO<sub>3</sub>, FeAlO<sub>3</sub> phase. Gls, glass. Sil, sillimanite. V, vapour.