

**Fig. S1:** Pictures of the quartzo-feldspathic granulite G3 (S1a) and the refractory granulite TAF501 (S1b) under polarized (upward) and polarized-analyzed (downward) light. Grt = Garnet, Sil = Sillimanite, Qz = Quartz, Fds = Feldspar, Opx = Orthopyroxene, Gl = Glass.

**Fig. S2:** Three pictures (polarized light, polarized-analyzed light and EBSD map) illustrating the reaction between sillimanite and garnet in the quartzo-feldspathic granulite G2. For this example, the garnet is almost totally replaced by a mixture of Opx + Sp + Qz.

**Fig. S3 to S7:** EBSD maps of the five selected granulite samples. Samples G2 and TAF500 have been cut perpendicular to the foliation and also to the lineation (YZ plane), while G3, G4 and TAF501 have been cut perpendicular to the foliation and parallel to the lineation (XZ plane).

**Fig. S8 and S9:** Crystallographic preferred orientation of the main rock-forming minerals in restitic (Fig. S6) and quartzo-feldspathic (Fig. S7) granulites. Lower hemisphere stereographic projections with contours at 1 Multiple of a Uniform Distribution (MUD) intervals. The grey scale corresponds to MUD for each cell. To facilitate comparisons, CPOs have been rotated to put [001] of sillimanite in the EW direction considering that the maximum concentration of this axis is representative of the lineation. The foliation is ~EW and normal to the plane of the pole figure.