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GEOCHEMISTRY OF BLUESCHIST FACIES MAFIC AND ULTRAMAFIC PSEUDOTACHYLTES

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Ultramafic and mafic pseuadotachylytes (PST) have been discovered within the Ligurian Ophiolite of the high pressure-low temperature metamorphic (HP-LT) ‘Shistes Lustres’ complex in Cima di Gratera, Corsica (Austrheim and Andersen, 2004). Ultramafic PST are preserved in lenses of pristine to hydrated peridotite and gabbro surrounded by schistose serpentinites. The PST have a large range in vein thickness from 1 mm to 25 cm, with common fault-vein thicknesses of 1-2 cm (Andersen and Austrheim, 2006). Petrography and geochemistry on PST from both gabbro and peridotite indicates that total/near-total fusion of the local host rock mineral assemblage typically occurs; bringing up the temperature of shear zone from 350º C to 1400 - 1700º C; depending on the host rock (Andersen and Austrheim, 2006). The composition of the PST is highly variable, even at the thin section scale and this has been attributed to the coarse-grained nature of the host rock and its small scale inhomogeneity. Almost all the bulk analyses of the PST are hydrous; the peridotitic PST more so than the gabbro; the H2O content of the melt ranges from 0 to 14 wt %. The hydrous nature of the PST is due to the melting of hydrous minerals (chlorite and serpentine - peridotite, glaucophane, epidote, Mg-hornblende - gabbro) in the host rock, rather than later hydration associated with exhumation (greenschist facies metamorphism and later alteration). Despite the fact that the peridotite is more water-rich than the gabbro the gabbro-hosted PST has crystallization products of hydrous blueschist facies mineral assemblages (glaucophane, edenite), whilst the peridotite-hosted PST has an anhydrous mineral assemblage of fassaitic pyroxene and olivine and contains an Al-rich, H2O-rich phase (glass/talc?). In order to explain this observation it is proposed that the local host rock mineral assemblage forms an upper limit on the temperature of the PST formed (Swanson, 1992 and Spray,1992); combined with the H2O saturation of the melt and its composition the resulting crystallization products will differ (Koons, 1982).
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