Experimental and natural pargasites: It's dependence on P, T, and the host peridotite compositions.

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Pargasitic amphiboles are often contained in hydrated peridotites derived from the upper mantle. Using the recent data on chemical compositions of experimentally produced sub-solidus-pargasites in MORB pyrolite (Niida and Green, 1999), together with those in Hawaiian pyrolite and in Tinaquillo lherzolite, we examine their compositional variations controlled by pressure, temperature, and the host bulk-rock compositions.

The Na_2O, K_2O, Al_2O_3, and TiO_2 contents (wt%) of pargasitic amphiboles are positively correlated with pressure and temperature, in harmony with their modal variations. The Na_2O and K_2O increase with increasing both pressure and temperature, whereas the Al_2O_3, and TiO_2 increase with increasing temperature and decrease with increasing pressure. This can be explained as increase of richterite component in amphiboles with pressure and temperature. The K_2O and TiO_2 also depend on those of the host peridotite compositions.

Pargasitic amphiboles in natural peridotites, such as mantle-derived xenoliths, orogenic lherzolites, have a systematic variation in chemical composition. The Na_2O+K_2O contents of pargasitic amphiboles from garnet lherzolite are clearly higher than those from spinel lherzolite, indicating a higher pressure and temperature equilibration. It is also detectable for natural pargasites that the K_2O and TiO_2 contents are due to those of the host peridotite compositions.