INFLUENCE OF ACMITE CONTENT IN ORDER/DISORDER PROCESSES IN OMPHACITE.

Cámara, F.[1], Nieto, F. [1] y Oberti, R. [2] ([1] *Departamento de Mineralogía y Petrología, Universidad de Granada-I.A.G.M. (C.S.I.C.),* [2] *C.N.R.-C.S. Cristallochimica Cristallografia. Pavia*)

Single-crystal X-ray structure refinement (SREF) was performed on 18 omphacite crystals with different acmite content. The samples are from eclogites belonging to the Nevado-Filabride Complex (Betic Cordilleras, SE Spain) and from eclogites and country-rock eclogites from Flemsøy, Western Norway. From the former locality three were found to be ordered with spatial group P2/n and the rest with C2/c. The two crystals from Flemsøy were P2/n. The omphacites have XNa 0.42-0.58 and show variable Fe^{3+} contents at M1 sites (0.0-0.32 a.f.u.). The ordered omphacitesshow Fe^{3+} not bigger than 0.12 a.f.u. and paired with Fe^{2+}, whereas the disordered crystals show variable Fe^{3+} and unpaired with Fe^{2+}. In spite of these Na contents (Jd-Di~1:1) most of the crystals are disordered, suggesting equilibrium temperatures higher than 850° C (Carpenter, 1981). As proposed by Rossi (1989), the acmite content in omphacites should have the same effect as a rise in temperature, and the order solvus should decrease steeply towards acmite. Omphacites equilibrated at temperatures below 850°C could show complete disorder. In fact, a lower temperature of 650° ± 50° C has been estimated from garnet-clinopyroxene pairs in these samples using the Ellis & Green calibration (1979) and considering Fe^{3+}=Na-Al in a 6 oxygen normalized formula. The P2/n pyroxenes of this group have low Fe^{3+} contents as deduced from SREF data and the Fe^{3+} is fully ordered at M11 while some Al still remains at M1. Several structural parameters also provide evidence of variable Fe^{3+} content at M1, such as an unusual enlargement of *c* and the volume of M2, and TAV changes with the charge at M2 following a clear trend to the acmite end-member value (fig. 1).

It is also worth considering the influence of kinetics, as ordering requires time for transformation and, unlike acmite content, rapid cooling or post-eclogite heating could prevent ordering in both

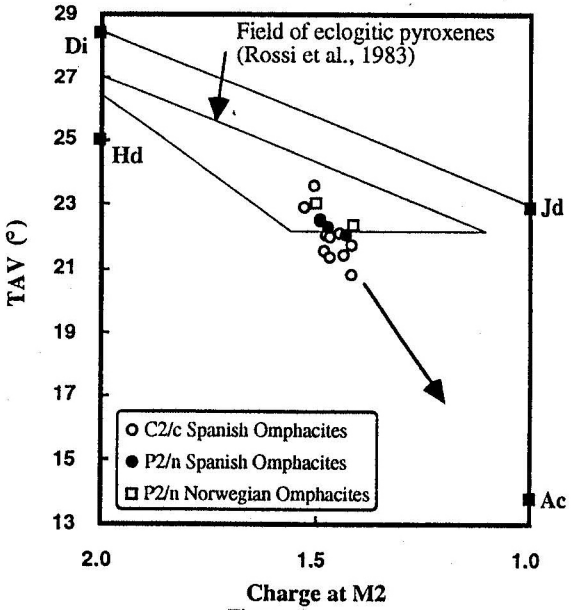

Figure 1

cases. A study on presence and development of microstuctures such as APD or exsolution lamella probably present in these pyroxenes is being carried out at present.

References:

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