Poster

(*P*,*T*)-behavior of an intermediate scapolite of unusual *I*4/*m* symmetry

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Scapolites are usually formed under metamorphic conditions in the presence of fluids, but are also reported as constituents of upper mantle xenoliths [1,2]. The scapolite series of minerals represents a complex non-binary solid solution, whose end members are: marialite [$Na_4Al_3Si_9O_{24}Cl$], meionite [$Ca_4Al_6Si_6O_{24}CO_3$] and silvialite [$Ca_4Al_6Si_6O_{24}SO_4$]. The members whose composition falls on the marialite-meionite joint appears to be the most common in natural occurrences [3,4]. The repreentatives close to marialite, on one side, and to meionite, on the other side, are usually reported to crystallize in the tetragonal *I*4/*m* space group, while intermediate scapolites are usually found in the primitive space group $P4_2/n$. In this study, we report a scapolite sample from Madagascar, which composition falls between those of the end-members marialite an meionite: $(Na_{1.86}Ca_{1.86}K_{0.23}Fe_{0.01})(Al_{4.36}Si_{7.64})O_{24}[Cl_{0.48}(CO_3)_{0.48}(SO_4)_{0.01}]$. Based on both X-ray and neutron single-crystal diffraction data, an anomalous *I*-centered lattice (*I*4/*m* space group) is observed. This unusual symmetry, for an intermediate scapolite, may be assigned to the presence of anti-phase domains too small to be detected by diffraction techniques. Experimental data based on *in situ* single-crystal X-ray diffraction show that the unusual *I*-centered lattice is always preserved at varying pressure and temperature up to 1000°C, whereas a phase transition towards a triclinic polymorph, that can be described according to a non-conventional *I*-1 symmetry, was found to occur at 9-10 GPa, with a minor influence from temperature. These results suggest that intermediate scapolites may crystallize with an *I*-centered crystal structure, whose preservation at ambient conditions may provide information on the thermal history (fast cooling) of the sample.

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