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e il tempo dell'uomo:
Le geoscienze fra passato e futuro



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Unusual symmetr of an intermediate scapolite

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The scapolite series of minerals represents a complex non-binary solid solution, which end members are: marialite [$\text{Na}_4\text{Al}_3\text{Si}_9\text{O}_{24}\text{Cl}$], meionite [$\text{Ca}_4\text{Al}_6\text{Si}_6\text{O}_{24}\text{CO}_3$] and silvialite [$\text{Ca}_4\text{Al}_6\text{Si}_6\text{O}_{24}\text{SO}_4$]. The members which composition falls on the marialite-meionite joint appears to be the most common in natural occurrences (Teertstra & Sherriff, 1997; 2]. The members close to marialite on one side and to meionite on the other side, are usually reported to crystallize in the tetragonal $I4/m$ space group, whereas 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 and meionite: $(\text{Na}_{1.86}\text{Ca}_{1.86}\text{K}_{0.23}\text{Fe}_{0.01})(\text{Al}_{4.36}\text{Si}_{7.64})\text{O}_{24}[\text{Cl}_{0.48}(\text{CO}_3)_{0.48}(\text{SO}_4)_{0.01}]$. Based on both X-ray and neutron single-crystal diffraction data, an anomalous I -centered lattice ($I4/m$ 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. In situ high- T X-ray diffraction investigations show that the $I4/m$ space group is observed to be stable at least up to 1000 °C.

Teertstra D.K. & Sherriff B. L. (1997) - Substitutional mechanisms, compositional trends and the end-member formulae of scapolite. *Chemical Geology*, 136(3-4), 233-260

Sokolova E. & Hawthorne F.C. (2008) - The crystal chemistry of the scapolite-group minerals. I. Crystal structure and long-range order. *The Canadian Mineralogist*, 46(6), 1527-1554.

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