

Pini S., Brigatti M.F., Affronte M., Malferrari D., Marcelli A. (2012) Magnetic behavior of trioctahedral micas with different octahedral Fe ordering. *Physics and Chemistry of Minerals*, 39(8), 665-674. DOI: 10.1007/s00269-012-0520-1.

ABSTRACT

This contribution is finalized at the discussion of the magnetic structure of two samples, belonging to phlogopite-annite [sample TK, chemical composition ${}^{\text{IV}}(\text{Si}_{2.76}\text{Al}_{1.24}) {}^{\text{VI}}(\text{Al}_{0.64}\text{Mg}_{0.72} \text{Fe}^{2+}_{1.45}\text{Mn}_{0.03}\text{Ti}_{0.15}) (\text{K}_{0.96}\text{Na}_{0.05}) \text{O}_{10.67} (\text{OH})_{1.31} \text{Cl}_{0.02}$] and polyolithionite-siderophyllite joints [sample PPB, chemical composition ${}^{\text{IV}}(\text{Si}_{3.14}\text{Al}_{0.86}) {}^{\text{VI}}(\text{Al}_{0.75}\text{Mg}_{0.01} \text{Fe}^{2+}_{1.03}\text{Fe}^{3+}_{0.13}\text{Mn}_{0.01}\text{Ti}_{0.01}\text{Li}_{1.09}) (\text{K}_{0.99}\text{Na}_{0.01}) \text{O}_{10.00} (\text{OH})_{0.65}\text{F}_{1.35}$]. Samples differ for Fe ordering in octahedral sites, $\text{Fe}^{2+}/(\text{Fe}^{2+}+\text{Fe}^{3+})$ ratio, octahedral composition, defining a different environment around Fe cations, and layer symmetry. Spin glass behaviour was detected for both samples, as evidenced by the dependency of the temperature giving the peak in the susceptibility curve from the frequency of the applied alternating current magnetic field. The crystal chemical features are associated to the different temperature at which the maximum in magnetic susceptibility is observed: 6 K in TK, where Fe is disordered in all octahedral sites, and 8 K in PPB sample, showing a smaller and more regular coordination polyhedron for Fe, which is ordered in the *trans*-site and in one of the two *cis*-sites.

Key words: Polyolithionite, siderophyllite, crystal chemistry, XAS, magnetic properties.