

The OH-F substitution in synthetic pargasite at 1.5 kbar, 850 °C

**JEAN-LOUIS ROBERT,¹ GIANCARLO DELLA VENTURA,^{2,*} MARK D. WELCH,³
AND FRANK C. HAWTHORNE⁴**

¹CRSCM-CNRS, 1A, Rue de la Férollerie, F-45071, Orléans Cedex 2, France

²Dipartimento di Scienze della Terra, Università della Calabria, Arcavacata di Rende, I-87030 (CS), Italy

³Department of Mineralogy, The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.

⁴Department of Geological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada

ABSTRACT

Amphiboles were synthesized at 1.5 kbar $P_{\text{H}_2\text{O}}$ and 850 °C along the join pargasite-fluoropargasite. Structural variations in the amphibole as a function of F have been characterized by a combination of SEM-EDS, X-ray powder diffraction, and infrared spectroscopy. SEM-EDS analyses show that, for increasing F in the system, there is a decrease in Al_{tot} in the amphibole and a significant decrease of F incorporation in the structure. In agreement with the EDS data, the variation in cell parameters and IR spectra show that incorporation of F in pargasite is restricted to about 1.0 atoms per formula unit (apfu). The OH-stretching spectra show fine structure caused by F replacing OH at the O3 anion site, and are consistent with two-mode behavior typical of A-site-filled amphiboles. The agreement between calculated and observed relative band intensities suggests complete short-range disorder of OH and F at the O3 anion site.