HIGH-RESOLUTION INFRARED SPECTRA AND ANALYSES OF SiF₄

V. BOUDON, Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS–Université Bourgogne Franche-Comté, 9 Av. A. Savary, BP 47870, F-21078 Dijon Cedex, France; L. MANCERON, Synchrotron SOLEIL, AILES Beamline, L’Orme des Merisiers, St-Aubin BP48, 91192 Cedex, France and MONARIS, UMR 8233, Université Pierre et Marie Curie, 4 Place Jussieu, case 49, F-75252 Paris Cedex 05, France

Volcanoes reject large amounts of sulfur-containing gases in the atmosphere; these represent 10 to 15 % of the anthropogenic sulfur emissions. Thermodynamic considerations show that silicon tetrafluoride (SiF₄) should be a normal trace component of volcanic gases. Some studies report that the possible importance of SiF₄ had been neglected because of the problems of reporting HF and SiF₄ separately in conventional analyses. However, a better knowledge of spectroscopic parameters is needed for this molecule in order to derive accurate concentrations. This is why we undertook an extensive high-resolution study of its infrared absorption bands, including the fundamentals and several overtone and combinations. We present here a detailed analysis and modeling of the strongly absorbing ν₃ fundamental, for the three isotopologues in natural abundance: ²⁸SiF₄ (92.23 %), ²⁹SiF₄ (4.67 %) and ³⁰SiF₄ (3.10 %). Progresses in the analysis of the other bands will be outlined.