



## Spectroscopic Studies on Nitric Acid Hydrates

**H. Grothe** (1), P. Baloh (1), B. Martín-Llorente (2), and S. Parker (3)

(1) Institute of Materials Chemistry, Vienna University of Technology, Vienna, Austria, (2) Instituto de Estructura de la Materia, CSIC, Serrano 123, 28006 Madrid, Spain, (3) ISIS Department, CCLRC Rutherford Appleton Laboratory, Didcot, UK (grothe@tuwien.ac.at / Fax: +43-1-25077-3890 / Phone: +43-1-25077-3809)

Mixtures of nitric acid hydrates and water ice are important constituents of solid Cirrus cloud particles. Due to the phase diagram only hexagonal ice and nitric acid trihydrate should have a reasonable thermodynamic stability and are commonly observed. However, a number of metastable modifications might also exist: NAD,  $\alpha$ -NAT, and cubic ice. The persistence of these metastable compounds remains uncertain and has not been proofed yet.

In the laboratory we have developed a model procedure in order to prepare and investigate all hydrates and ice mixtures. The investigation methods are X-ray diffraction [1, 2], FTIR spectroscopy [3], Raman spectroscopy [4, 5] and Environmental SEM [6, 7]. Only recently, we have also applied Inelastic Neutron Scattering. The aim was to verify the phase composition by diffraction and to collect the spectroscopic data, which are needed for interpretation of field measurements and aerosol chamber experiments. Here, the morphology of the particles has to be considered, since it can have an important impact on the respective extinction spectra.

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