



Contribution ID: 107

Type: Poster

Infrared spectra of H₂O aerosols diluted with D₂O

Thursday, 20 November 2014 17:30 (1h 30m)

Water is both an important and interesting molecular system that needs to be well understood because it exists in so many fields of research, and more often than not its presence can be undesired. The ice particles in both our own atmosphere, and the ISM, predominantly exist as either small ice particles or silicate dust grains coated with ice which can act as a reaction medium for producing more complex molecules.

We explore how isotopic dilution, using D₂O, affects the shape and frequency of the vibrations that are observed in the mid infrared (MIR) spectrum[1], more specifically the OH- and OD-stretching modes. In addition to changing the concentration of D₂O used, the physical aspects of the experiment itself also contribute to what is observed. Presented herein, is the MIR data collected at the Australian Synchrotron, using different H₂O:D₂O ratios, and at temperatures ranging from 6 K to 210 K.

1Medcraft, C, McNaughton, D, Thompson, CD, Appadoo, DRT, Bauerecker, S, Robertson, EG, Phys. Chem. Chem. Phys. 2013, 15, 3630

Keywords or phrases (comma separated)

ice, infrared, aerosol, synchrotron

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Session Classification: Welcome Function, Poster Session, Exhibition

Track Classification: Earth and Environment