Geophysical Research Abstracts
Vol. 12, EGU2010-2718-1, 2010
EGU General Assembly 2010

Infrared spectra of water-ammonium ices. The elusive 6.8 μm band

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The recent observations made with the Spitzer Space Telescope show that the previously observed 6.8 μm spectral feature is noticeably present in many stellar objects: on young stellar objects, dark cloud star-forming region, etc. (1-2) The most generally accepted carrier for this feature is the NH4+ (nu4 bending mode), although this hypothesis is still under debate. This work presents an investigation on NH4+ in water ices. Frozen solutions of NH4+Cl– and HCOO–NH4+ in water in an astrophysical range of concentrations and temperatures are analysed by infrared spectroscopy. The ices are prepared by hyperquenching of liquid droplets of these solutions on a cold substrate. Our results indicate that, independently of the counter-ion present, when the ammonium ion is surrounded by water molecules the 6.8 μm spectral feature is hardly seen and therefore it cannot suffice to explain the observed spectral feature in the stellar objects (3).

References:
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