Laboratory spectra of ice mixtures relevant to New Horizons Observations of Pluto and TNOs

R. M. E. Mastrapa (1,2), J. C. Cook (2), D. W. White (2), M. T. Berry (3), and S. Sandford (1)
(1) SETI Institute, Mountain View, CA (Rachel.M.Mastrapa@nasa.gov) (2) NASA Ames Research Center, Moffett Field, CA (3) San Jose State University, San Jose, CA

Introduction

CH_4-ice has multiple low temperature phases that have distinct spectra [1]. In the laboratory, infrared spectra CH_4-ice diluted in N2 have absorptions that are different in shape, location, and strength compared to those of pure CH_4-ice [2]. However, the full range of dilutions and changes with temperature have not been consistently explored for α-N_2-ices. Although, β-N_2 ices are common on Triton and Pluto, some TNOs may have surfaces where the temperatures are low enough for α-N_2 to survive.

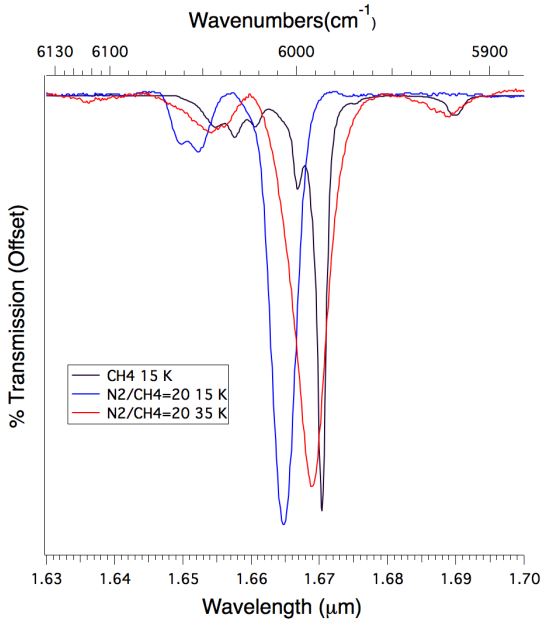


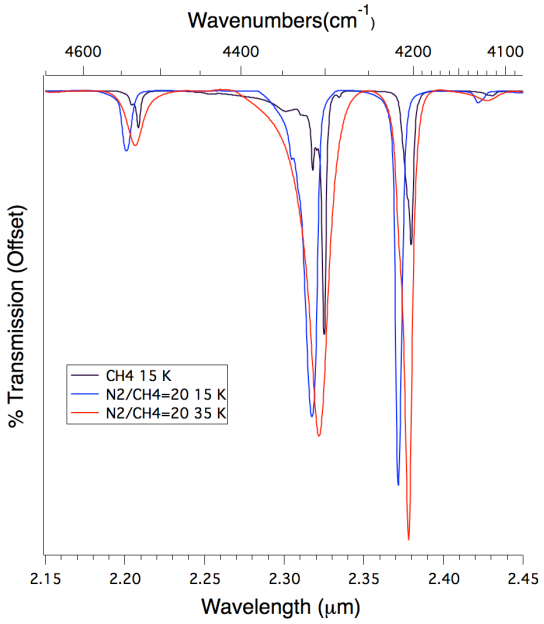
Figure 1. Transmission spectra of pure CH_4-ices at 15 and a mixture of N_2/CH_4=20 at 15 and 35 K,

Figure 2. Transmission spectra of pure CH_4-ices at 15 and a mixture of N_2/CH_4=20 at 15 and 35 K, depicting changes in the absorptions near 2.2, 2.32, and 2.38 μm.

Summary and Conclusions

We have demonstrated multiple changes in the location of CH_4 bands in both pure samples and dilutions in N_2. We will present results detailing the changes in absorption profile and location as a function of temperature and dilution for all wavelength ranges relevant to observations of TNOS.

depicting changes in the absorptions near 1.67 μm.



References

1. Grundy, W.M., B. Schmitt, and E. Quirico, Icarus, 2002. **155**: p. 486-496.
2. Quirico, E. and B. Schmitt,. Icarus, 1997. **127**: p. 354-378.