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The Strengths of Near-Infrared Absorption Features Relevant to Planetary Ices

PERRY GERAKINES[1], JENNIFER BRAY[1], ALANDRA DAVIS[1] and CHRISTINA RICHEY[1]

[1]*Department of Physics, University of Alabama at Birmingham*

The abundances of ices in planetary environments have historically been obtained through measurements of near-infrared absorption features (wavelength = 1.0-2.5 microns), and near-IR transmission measurements of materials present in the interstellar medium are becoming more common. For transmission measurements, the band strength (or absorption intensity) of an absorption feature must be known in order to determine the column density of an ice component. In the experiments presented here, we have measured the band strengths of the near-IR absorption features for several molecules relevant to the study of interstellar icy grain mantles and icy planetary bodies: carbon monoxide, carbon dioxide, carbon suboxide, methane, water, methanol, and ammonia. During a vacuum deposition, the sizes of the near-IR features were correlated with that of a studied mid-IR feature whose strength is well known from previous ice studies. These data may be used to determine ice abundances from observed near-IR spectra of interstellar and planetary materials or to predict the sizes of near-IR features in spectral searches for these molecules in astrophysical environments.