THE VIBRATIONAL STRUCTURE OF OH RADICAL AND OH-H_2O COMPLEX: A MATRIX ISOLATION STUDY

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Hydroxyl radical, 'the detergent of atmosphere', the title is acquired due to capability of transformation of trace component present in atmosphere mainly troposphere into water soluble forms and also plays vital role in chemistry of the interstellar medium. The infrared spectra of OH radical isolated in solid neon have been investigated by Fourier Transform infrared spectroscopy (FTIR). OH monomer was prepared by microwave discharge of a mixture of water and neon gas at different concentrations prior to deposition on the cold mirror at 5 K. The microwave discharge of H_2O/Ne system is remarkable due to its propensity to form OH radical and other species like H_2, HO_2, OH-HO_2, OH-H_2O and $(OH)_n$-H_2O and IR spectroscopy reveals a variety of phenomena far from being fully understood. OH concentration studies, D/H isotopic substitution, and subsequent annealing leads to the characterization of the different species trapped in the neon matrix. All vibrationnal mode of OH-H_2O complex have been detected. The presence of species such as H_2 and HO_2 after matrix deposition led us to carry subsequent UV photolysis of our samples where the complex OH-H_2O may also be formed by following reaction:

HO_2-H_2 + hν $\rightarrow$ OH-H_2O