

THE VIBRATION-ROTATION EMISSION SPECTRA OF GASEOUS CdH₂ AND CdD₂

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The vibration-rotation emission spectra of CdH₂ and CdD₂ molecules have been recorded at high resolution using a Fourier transform spectrometer. The molecules were generated in a furnace-discharge emission source by reaction of cadmium vapor with molecular hydrogen or deuterium. The fundamental bands for the antisymmetric stretching mode (ν_3) of CdH₂ and CdD₂ were detected at about 1771.5 cm⁻¹ and 1278.3 cm⁻¹, respectively. In addition, the 002(Σ_g^+) – 001(Σ_u^+) and 011(Π_g) – 010(Π_u) hot bands were observed for CdH₂. Spectroscopic constants were determined for each of the twelve observed isotopologues: ¹¹⁰CdH₂, ¹¹¹CdH₂, ¹¹²CdH₂, ¹¹³CdH₂, ¹¹⁴CdH₂, ¹¹⁶CdH₂, ¹¹⁰CdD₂, ¹¹¹CdD₂, ¹¹²CdD₂, ¹¹³CdD₂, ¹¹⁴CdD₂, ¹¹⁶CdD₂. The average Cd–H and Cd–D bond distances (r_0) were determined to be 1.683028(10) Å and 1.679161(16) Å, respectively.