

## ISOTOPOMER DEPENDENCE AND BORN-OPPENHEIMER BREAKDOWN IN MID AND FAR INFRARED SPECTRA OF CdH

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New measurements of far infrared transitions within the  $v = 1$  levels of the  $X^2\Sigma^+$  state of 6 different isotopomers of CdH and CdD are combined with previous mid-infrared<sup>a,b</sup> and far-infrared<sup>c</sup> data in a combined-isotopomer analysis which yields improved rotational constants, spin-rotation constants and Born-Oppenheimer breakdown (BOB) parameters for this system. Recent work by one of us<sup>c</sup> had reported the measurement and analysis of far infrared transitions within the  $v = 0$  level of 12 isotopomers CdH and CdD, but the combined-isotopomer analysis reported there found that the CdH and CdD data appeared to be incompatible unless separate Cd-atom BOB parameters were introduced for the inertial rotation constants of CdH and CdD, and BOB parameters introduced for the spin-rotation constants. The present work shows that taking account of the  $v$ -dependence of the mechanical rotational parameters for  $v = 0$  isotopomers implied by the reduced-mass-scaling of vibrational quantum numbers allows the far infrared data to be accounted for without invoking these two assumptions.

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<sup>a</sup> R.-D. Urban, U. Magg, H. Birk and H. Jones, *J. Chem. Phys.* **92**, 14-21 (1990).

<sup>b</sup> H. Birk, R.-D. Urban, P. Polomsky and H. Jones, *J. Chem. Phys.* **94**, 5435-5442 (1991).

<sup>c</sup> T.D. Varberg and J.C. Roberts, *J. Mol. Spectrosc.* **223**, 1-8 (2004)