

## THE RADIAL HAMILTONIANS FOR THE $A^1\Sigma^+$ and $X^1\Sigma^+$ STATES OF LiH and Li<sub>2</sub>

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Extensive collections of literature data involving the  $A^1\Sigma^+$  and  $X^1\Sigma^+$  states of LiH and the  $A^1\Sigma_u^+$  and  $X^1\Sigma_g^+$  states of Li<sub>2</sub> have been employed in direct least-squares fits of the radially dependent Hamiltonians. Vibration-rotational and pure rotational transition energies for the ground  $X^1\Sigma^+$  state of <sup>6</sup>LiH, <sup>7</sup>LiH, <sup>6</sup>LiD and <sup>7</sup>LiD, along with the entire collection of  $A^1\Sigma^+ - X^1\Sigma^+$  emission and absorption data for the four isotopomers, are used in the fit for LiH; the data set for Li<sub>2</sub> consists of more than 6000  $A^1\Sigma_u^+ - X^1\Sigma_g^+$  absorption lines. The Born-Oppenheimer potentials are represented by a modified Lennard-Jones function that provides for correct behaviour in the near dissociation, long-range region of the potential. The LiH data set extends over  $\approx 65\%$  and  $80\%$  of the well depths of the  $A^1\Sigma^+$  and  $X^1\Sigma^+$  states, respectively, while the Li<sub>2</sub> data covers  $\approx 70\%$  and  $99.97\%$  of the well depths (extending out to more than  $14 \text{ \AA}$  in the ground  $X^1\Sigma_g^+$  state). The fits take full account of Born-Oppenheimer breakdown effects, and reproduce the measured line positions to within their estimated accuracies.