

ELECTRONIC SPECTROSCOPY OF $\text{Li}(\text{NH}_3)_4$

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$\text{Li}(\text{NH}_3)_4$ has been proposed as a key entity in lithium-ammonia solutions, but its spectral signature has so far proved impossible to distinguish from other species in these solutions. Here we present the first electronic spectrum of $\text{Li}(\text{NH}_3)_4$ in the gas phase in an effort to understand the electronic structure of this important cluster. This spectrum was recorded using mass-selective depletion spectroscopy. Strong absorption is observed in the near-infrared and the band system is assigned to the $\tilde{A}^2T_2 - \tilde{X}^2A_1$ transition in a nominally tetrahedral complex. However, an extensive vibrational progression in a low frequency bending vibration is indicative of a substantial Jahn-Teller effect in the excited electronic state. Our observations confirm a recent theoretical prediction that the electronic spectrum of $\text{Li}(\text{NH}_3)_4$ will strongly overlap with the spectrum of the solvated electron in liquid ammonia.