Dissociation Energy of the Ground State of NaH[1] THOU-JEN
WHANG, HSIEN-YU HUANG, TSAI-LIEN LU, Department of Chemistry, National ChengKung University, YUNG-YUNG CHANG, CHIN-CHUN TSAI, Department of Physics, National ChengKung University — The dissociation energy of
the ground state of NaH has been determined by analyzing the observed near dissociation rovibrational levels of $X^1\Sigma^+$ and $C^1\Sigma^+$ states. These levels are carried out by
stimulated emission pumping and fluorescence depletion spectroscopy. The highest
vibrational level observed in ground state is only about $40\,\mathrm{cm}^{-1}$ from its dissociation
limit and is about $30\,\mathrm{cm}^{-1}$ from its dissociation limit for $C^1\Sigma^+$ state. Determining
the vibrational quantum number at dissociation v_D from the highest four vibrational
levels of ground state yields the dissociation energy $D_e{=}15\,815\pm5\,\mathrm{cm}^{-1}$. A Hybrid
potential based on the rotationless Rydberg-Klein-Rees curve and the modified *ab
initio* calculation is constructed for the $C^1\Sigma^+$ state. The dissociation energy of
ground state can be deduced from the asymptotic limit of $C^1\Sigma^+$ state and it agrees
well with obtained from the ground state v_D.

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