ZERO ELECTRON KINETIC ENERGY PULSED FIELD IONIZATION (ZEKE) SPECTROSCOPY OF $CdCH_3$ AND $ZnCH_3$

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The two-color $(1+1')$ REMPI and ZEKE spectra of the $CdCH_3$ and $ZnCH_3$ radicals are reported for the first time. Based upon the observed intensities in the ZEKE spectrum for $CdCH_3$, via transitions to different vibrational levels of the $\widetilde{A}\,^2E$ intermediate state, the band previously assigned as the upper spin-orbit component of the vibrationless level of the $\widetilde{A}\,^2E \leftarrow \widetilde{X}\,^2A_1$ transition in neutral $CdCH_3$ is reassigned. This band which has now been observed in both LIF and REMPI experiments, is reassigned as the 6_0^1 band of the lower spin-orbit component, $^2E_{1/2}$. The ZEKE spectra, taken via various intermediate rovibronic levels, are used to reveal rovibrational structure of the $CdCH_3$ and $ZnCH_3$ cations and to measure the adiabatic ionization energies for both radicals. These radicals belong to the C_{3v} point group and are therefore subject to a Jahn-Teller interaction in the $\widetilde{A}$ state, which allows a broader range of K' states to be accessible in the LIF and REMPI experiments thereby enabling access to a broader range of K states for the ions in the ZEKE experiment. The resolved K structure in the level with one quanta of ν_6 excitation in the ion enables estimates of both the rotational constant A and the coriolis coupling constant $a\zeta_t$ to be made. Vibrational frequencies and assignments for the ions will be reported.