DETECTION OF HIGHLY PREDISSOCIATIVE LEVELS OF CH $B\ ^2\Sigma^-$ STATE WITH TWO-COLOR RESONANT FOUR-WAVE MIXING SPECTROSCOPY

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We demonstrate an application of two-color resonant four-wave mixing (TC-RFWM) spectroscopy to detect highly predissociative levels of the $B\ ^2\Sigma^-$ state of CH in a hostile environment of an oxyacetylene flame. The probe and the grating wavelengths are in resonance with the $A\ ^2\Delta$ - $X\ ^2\Pi$ and $B\ ^2\Sigma^-$ - $X\ ^2\Pi$ transitions, respectively. We measured 42 previously unobserved rovibronic lines of the 0-0 band and additional 30 lines of the 1-0 band of the $B\ ^2\Sigma^-$ - $X\ ^2\Pi$ system to access the rotational quantum number N' up to 20 and 12 of =0 and 1 of the $B\ ^2\Sigma^-$ state, respectively. Inclusion of measured additional line positions of the 0-0 and the 1-0 bands yields spectral parameters of the $B\ ^2\Sigma^-$ state significantly improved over those obtained previously with only non-predissociative lines; one additional rotational constant L_v is determined. Although power saturation is significant even at lowest applicable laser energies, we estimated lifetimes with studies of power dependence of line widths. The lifetimes of the highest detectable level of $B\ ^2\Sigma^-$ v' = 0 and 1 are 3$\pm$1 ps (N' = 20) and 8$\pm$2 ps (N' = 11), respectively. We will also present preliminary data of TC-RFWM of CH in supersonic jet; saturation dip is readily observable even at low laser energies.