OPTICAL-OPTICAL DOUBLE RESONANCE SPECTROSCOPY OF YTTRIUM MONOHALIDES

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High resolution optical-optical double resonance (OODR) spectra of YCl and YBr in the spectral region between 338.9 and 371.7 nm have been obtained using laser radiation from continuous wave dye and Ti:sapphire lasers pumped by argon ion lasers. The OODR spectrum was observed by recording the laser induced fluorescence from the excited state. Reacting laser-ablated yttrium atoms, respectively, with $BCl_3$ and $C_2H_5Br$ seeded in helium produced YCl and YBr molecules. For YCl, the [27.2] $^1\Delta$ state was reached via the intermediate $B^1\Pi$ from the $X^1\Sigma$ state. The molecular constants for the v = 1 level of the [27.2] $^1\Delta$ state were determined. For YBr, two new electronic states, namely: [26.0] $^1\Pi$ and [29.0] $^1\Pi$ were observed via the intermediate $C^1\Sigma$ state from the $X^1\Sigma$ state. Accurate molecular constants for the v = 4 and 5 levels of the [26.0] $^1\Pi$ state and the v = 1 and 2 of the [29.0] $^1\Pi$ state were determined. The observation of the spectra of isotopic molecules confirmed the vibrational quantum number assignment of the measured vibronic levels.