Spectroscopic analysis on the $5^1\Sigma^+_0$, $3^1\Pi_1$, $5^3\Sigma^+_1$, and $4^3\Pi_1$ states of the KRb diatomic molecule using a molecular beam YONGHOON LEE, Mokpo National University, BONGSOO KIM, KAIST, JIN-TAE KIM, Chosun University — The $5^1\Sigma^+$, $3^1\Pi$, $5^3\Sigma^+_1$, and $4^3\Pi_1 \leftarrow X^1\Sigma^+ \ (v'' = 0, 1)$ states of the KRb diatomic molecule near 440 nm have been identified using mass-resolved resonance enhanced two-photon ionization (RE2PI) in a cold molecular beam. For the $3^1\Pi$ state, the electronic term values ($T_e$) and vibrational constants are determined. From a rotational contour analysis, the $\Omega$ symmetries of the upper electronic states of the observed bands are assigned. Vibrational numberings of the experimentally observed levels of the $5^1\Sigma^+$, $3^1\Pi$, $5^3\Sigma^+_1$ and $4^3\Pi_1$ states, are also assigned. The fitted perturbation constants such as spin-orbit coupling matrix element, rotational temperature, linewith, $T_v$, and rotational constants have been determined and used to know line profiles of the rotational spectra.