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Studies of rotationally inelastic collisions of NaK and NaCs with Ar and He perturbers[1] J. JONES, C. FAUST, K. RICHTER, C.M. WOLFE, S. ASHMAN, R.F. MALENDA, P. WEISER, S. CARLUS, A. FRAGALE, A.P. HICKMAN, J. HUENNEKENS, Lehigh University — We report studies of rotationally inelastic collisions of Ar and He atoms with the molecules NaK and NaCs prepared in various ro-vibrational levels of the $A\,^1\Sigma^+$ electronic state. We use laser induced fluorescence (LIF) and polarization labeling (PL) spectroscopy in a pump-probe, two step excitation process. The pump excites the molecule to a ro-vibrational level (v, J) in the A state. The probe laser is scanned over transitions to the $3\,^1\Pi$ state in NaK or the $5\,^3\Pi$ state in NaCs. In addition to strong direct lines, we observe weak satellite lines that arise from collision-induced transitions of the A state level (v, J) to $(v, J + \Delta J)$. The ratio of intensities of the satellite line to the direct line in LIF and PL yields information about population and orientation transfer. Preliminary results show a strong propensity for collisions with ΔJ=even for NaK; the propensity is larger for He than for Ar. Collisions of NaCs with He show a similar propensity, but collisions of NaCs with Ar do not. Theoretical calculations are also underway. For He-NaK, we have completed potential surface calculations using GAMESS and coupled channel scattering calculations of rotational energy transfer and transfer of orientation.

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