COLLISIONAL ORIENTATION TRANSFER FACILIATED POLAROZATION SPECTROSCOPY[a]

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Collisional orientation transfer facilitated V-type double-resonance polarization spectroscopy technique was applied to study the A-b complex of Rb_2[a] and Cs_2[b]. Since spectral congestion makes it difficult to find isolated pump transitions for heavy molecules such as Rb_2 and Cs_2, this technique significantly enlarges the range of rotational levels that can be observed per vibrational level. Collisional satellite lines with ΔJ up to 58 were observed in the Rb_2 polarization experiment. In the Cs_2 experiment, due to weaker Franck-Condon factors, collisional satellite lines with ΔJ_{max} equals to 12 were observed.

Collisional orientation transfer in polarization spectroscopy was first observed with buffer gas pressure of several hundred Torr[c]. The high pressure led to loss of spectral resolution from collisional broadening. Only 1 to 3 Torr of argon buffer gas pressure was used in our experiments to obtain spectra with much higher resolution. Among the six types of possible probe signals[d], we assigned and analyzed the signals from the V type excitation scheme. The data was used in the global deperturbation analysis of the A-b complex of both Rb_2 and Cs_2.

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