

CHEM 26700 (Experimental Physical Chemistry) Lab Reports

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Steven Labalme
12 January 2023

26 January 2023

1 UV-VIS ANALYSIS OF IODINE

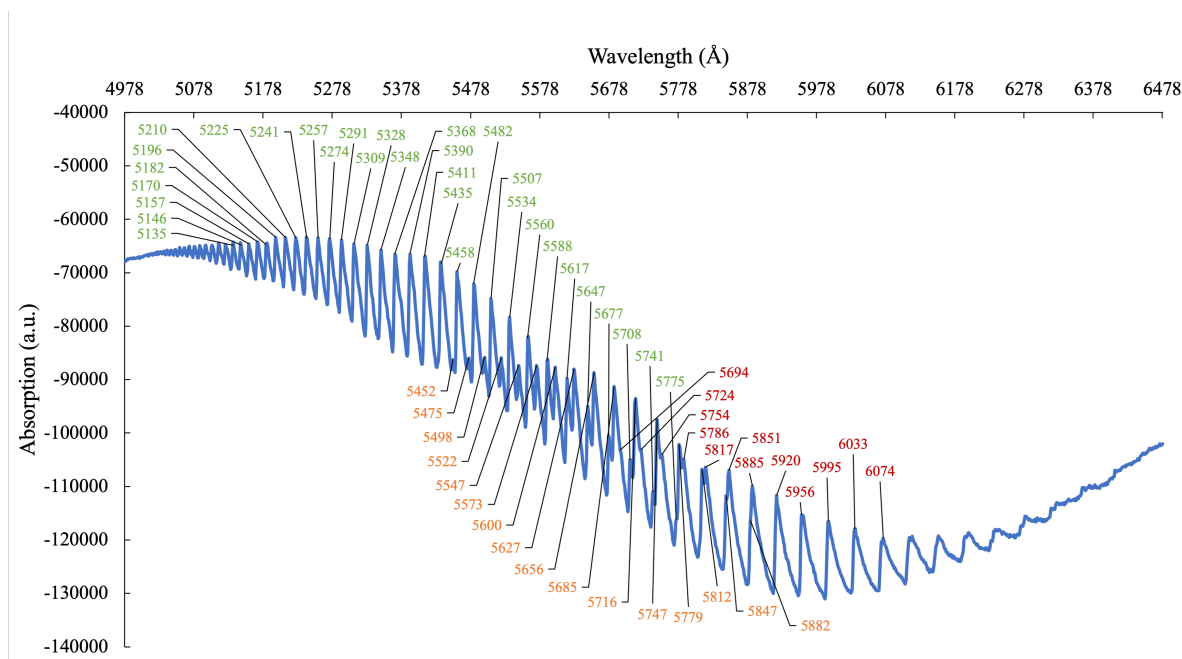


Figure 1: The absorption spectrum of gaseous I_2 between $\lambda = 5000 - 6500$ Å.

v'	v''	$\omega \text{ (cm}^{-1}\text{)}$	v'	v''	$\omega \text{ (cm}^{-1}\text{)}$	v'	v''	$\omega \text{ (cm}^{-1}\text{)}$
						10	2	16463
						11	2	16575
						12	2	16680
			13	1	17001	13	2	16789
14	0	17316	14	1	17102	14	2	16891
15	0	17418	15	1	17205	15	2	16992
16	0	17519	16	1	17304	16	2	17091
17	0	17614	17	1	17400	17	2	17190
18	0	17708	18	1	17494	18	2	17283
19	0	17803	19	1	17590	19	2	17379
20	0	17895	20	1	17680	20	2	17470
21	0	17985	21	1	17771	21	2	17562
22	0	18070	22	1	17857			
23	0	18158	23	1	17943			
24	0	18241	24	1	18027			
25	0	18321	25	1	18109			
26	0	18399	26	1	18188			
27	0	18480	27	1	18264			
28	0	18552	28	1	18341			
29	0	18628						
30	0	18698						
31	0	18768						
32	0	18835						
33	0	18900						
34	0	18960						
35	0	19022						
36	0	19080						
37	0	19138						
38	0	19193						
39	0	19245						
40	0	19297						
41	0	19342						
42	0	19391						
43	0	19432						
44	0	19474						

Table 1: Peaks and their corresponding transitions.

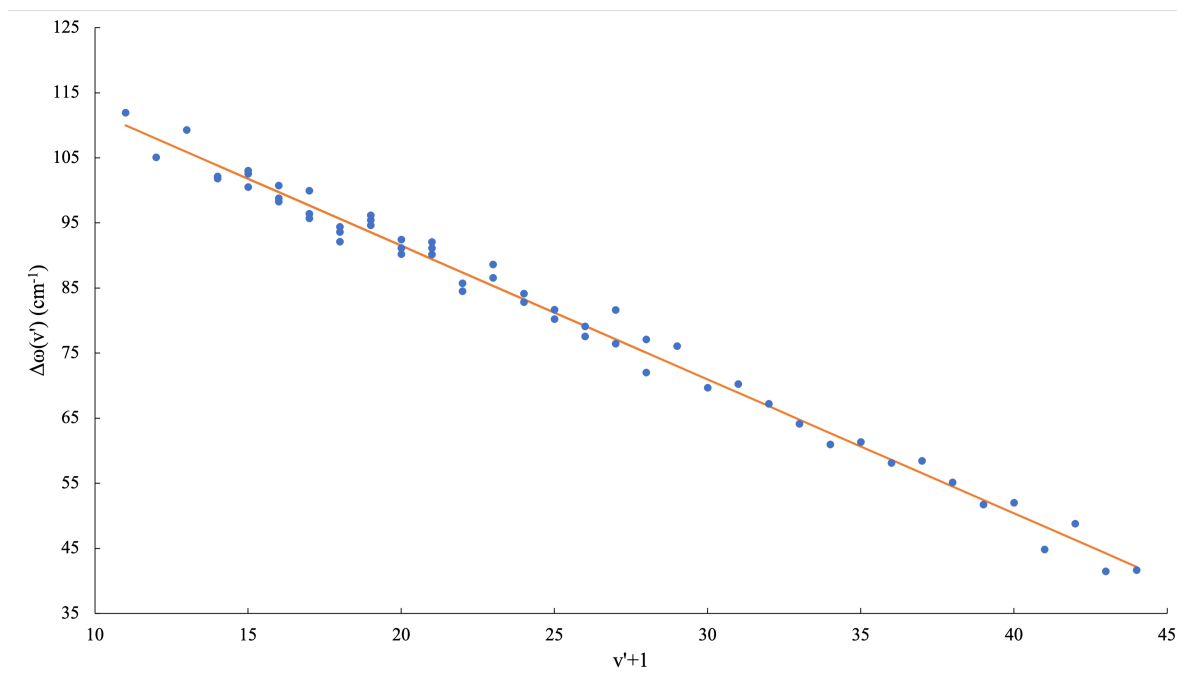


Figure 2: Birge-Sponer plot for the B state.

	$\bar{\nu}'_e$	$\bar{\nu}'_e x'_e$	D'_e	D'_0	$\bar{\nu}''_e$	$\bar{\nu}''_e x''_e$	D''_e	D''_0	T_e
Calculated values	132.62	1.0279	4277.2	4211.1	216.10	1.2583	9278.5	9170.7	12 604
Literature values^{1,2}	125.69	0.764	4112	4046	214.50	0.614	12 244	12 137	15 769.01

Table 2: Calculated spectroscopic constants and their reported values.

Note that the units for all values in Table 2 is cm^{-1} .

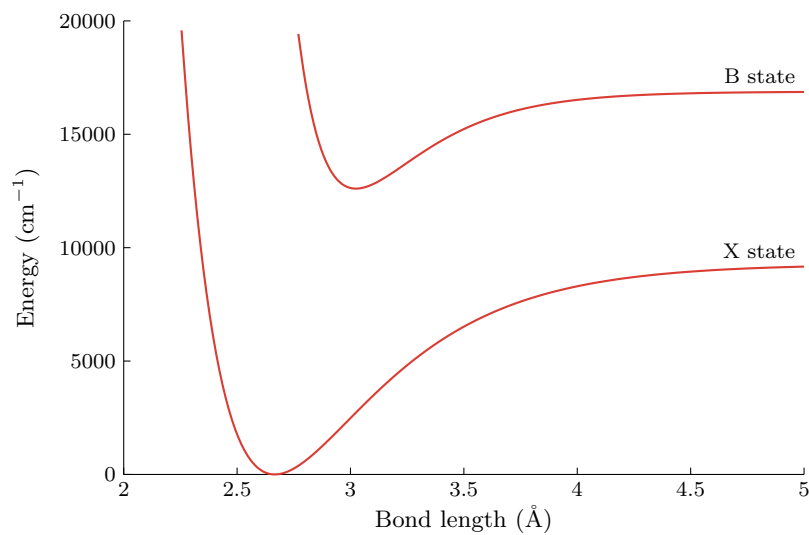


Figure 3: Morse potential curves.

References

- (1) Huber, K. P.; Herzberg, G. H. In *NIST Chemistry WebBook, NIST Standard Reference Database Number 69*, Linstrom, P. J., Mallard, W. G., Eds., <https://doi.org/10.18434/T4D303>; National Institute of Standards and Technology: Gaithersburg MD, 20899; Chapter Constants of Diatomic Molecules.
- (2) McNaught, I. J. The Electronic Spectrum of Iodine Revisited. *J. Chem. Educ.* **1980**, *57*, 101–105.