

factors must be involved since specific effects between the *tris*(ethylenediamine)cobalt(III) cation and the *tris*(2,2'-bipyridine)osmium(II) and (III) cations have been reported<sup>4</sup>, where chelate hydrogen-bonding is not possible.

It appears probable that all these phenomena are but manifestations of configurational activity as originally proposed by Dwyer<sup>5</sup>. Therefore those optically inactive complexes for which activity effects have been observed should also display circular dichroism when in the presence of the optically active agent.

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### Relation between Thermodynamic Property Change and Vibrational Frequency Shift in Ethyl Halides

RELATIONS can be found by plotting the difference of the ideal gas state thermodynamic properties  $\Delta S^\circ$  and  $\Delta C_p^\circ$ ; formed between the thermodynamic property values of ethane,  $C_2H_6$ , and its homologues,  $C_2H_5X$  ( $X = F, Cl, Br, I$ ), against the corresponding C-X bond stretching and C-C-X bond bending frequencies in ethyl halide series (Fig. 1). The results are presented in Table 1.

As the shifts in C-X bond stretching frequency with change in substituent in ethyl halide series correlate nearly linearly with the respective thermodynamic property increments in entropy,  $\Delta S^\circ$ , and heat capacity,  $\Delta C_p^\circ$ , it seems plausible to believe that these stretching frequencies do not appreciably interact with other modes. The C-C-X bond bending frequencies although also yielding smooth curves (Fig. 1), however, have a greater degree of possible interaction.

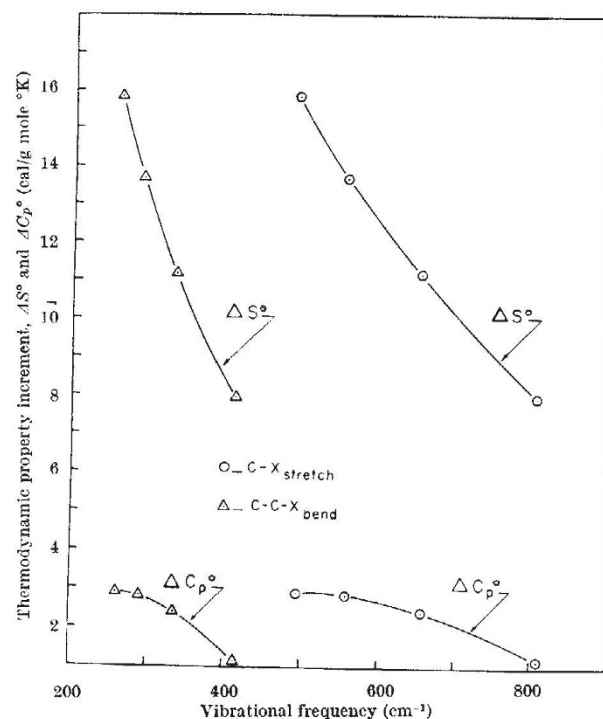


Fig. 1

Table 1

Compound	Thermodynamic property difference (at 298.16° K)		Vibrational frequency (cm <sup>-1</sup> )	
	$\Delta C_p^\circ$	$\Delta S^\circ$	C-X stretch	C-C-X bend
Ethane $C_2H_6$	0 (ref. 1)	0 (ref. 1)	—	—
Ethyl fluoride $C_2H_5F$	1.14 (ref. 2)	7.93 (ref. 2)	810 (ref. 4)	415 (ref. 4)
Ethyl chloride $C_2H_5Cl$	2.42 (ref. 3)	11.14 (ref. 3)	658 (ref. 5)	336 (ref. 6)
Ethyl bromide $C_2H_5Br$	2.83 (ref. 3)	13.65 (ref. 3)	560 (ref. 6)	292 (ref. 3)
Ethyl iodide $C_2H_5I$	2.88 (ref. 2)	15.80 (ref. 2)	497 (ref. 6)	262 (ref. 7)

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## BIOCHEMISTRY

### Identification of the Yellow Lupin Growth Inhibitor as (+)-Abscisin II ((+)-Dormin)

THE presence of an abscission-accelerating substance in the pods of yellow lupin (*Lupinus luteus* var. Weiko II) was deduced by Van Steveninck<sup>1</sup>. He was able to show that the whorls of fertilized pods at the base of the inflorescence induced the abscission of younger, distal pods. Plants infected with pea mosaic virus underwent a different pattern of abscission suggesting that the hormonal balance was disturbed<sup>2</sup>. Paper chromatography of the acids extracted from lupin pods coupled with a wheat coleoptile extension assay revealed an inhibitory band which appeared to contain the factor controlling pod abscission<sup>3</sup>.

A highly active and partly crystalline concentrate of the inhibitory material obtained from 700 kg of yellow lupin pods by Rothwell and Wain<sup>4</sup> has now been examined by a spectropolarimetric method recently described<sup>5</sup>. The sample showed a positive Cotton effect with extrema at 287 and 245 m $\mu$  and a profile identical with that of (+)-abscisin II. The ultra-violet absorption spectrum in alkaline and acidic ethanol was consistent with that of abscisin II (ref. 6) together with a superimposed, weak absorption peak at 237 m $\mu$  which could be attributed to an impurity. Based on absorbance at 262 m $\mu$  the molar amplitude of the Cotton effect was  $\sim 240,000^\circ$ , which is in good agreement with that of (+)-abscisin II (ref. 5).

The inhibitory activity of the sample in the wheat embryo assay<sup>6</sup> was slightly less than twice that of synthetic racemic abscisin II used for comparison. Since we have previously shown<sup>7</sup> that (+)-abscisin II has about twice the inhibitory activity of the racemic compound, the spectropolarimetric assay is confirmed; the sample is largely (+)-abscisin II.

The identification of sycamore dormin as abscisin II extended the known range of this compound's physiological effects. Recently the dormancy inducing inhibitor in birch leaves<sup>8</sup> and the germination inhibitor in rosehips<sup>9</sup> have also been identified as (+)-abscisin II (ref. 5) so that the role of this compound in controlling dormancy is now well established. The identification of the lupin factor places its abscission-inducing role<sup>10</sup> on a firmer basis,