

Spectral location of the "A" band absorption due to impurities in alkali halide crystals

Crystal	Impurity	Peak (Å)	Ref. No.	Max. pressure (atm.)
	Thallium	2540	8	50000
	Thallium	2670	8	127000
	Thallium	2930	8	50000
	Thallium	2475	8	50000
	Thallium	2610	8	130000
	Thallium	2870	8	129500
	Thallium	2590	8	94000
	Thallium	2860	8	110000
	Thallium	2630	8	158000
	Thallium	2990	8	118000
	Thallium	2858	—	124000
	Thallium	2836	—	50000
	Thallium	2810	—	50000
	Thallium	2708	—	50000
	Indium	2815	9	120500
	Indium	2930	10	131000
	Bismuth	3712	—	114000
	Lead	2740	11	131000
	Lead	3040	11	111500
	Lead	3578	—	50000
	Lead	2730	11	140000
	Lead	3020	11	170000
	Lead	3542	—	130500
	Lead	2720	11	50000
	Lead	3004	—	120000
	Lead	3541	—	5000
	Lead	2849	—	89000
	Lead	3705	—	50000
	Lead	3077	—	143000
	Lead	3580	—	1
	Copper (ic)	2650	12	50000
KBr	Copper (ic)	2650	12	117000

ions next to the impurity produce at most a perturbation on the system, but not a first-order effect. This is consistent with the Seitz model, but inconsistent with the complex ion model.

At phase transitions, such as occur in the potassium halides at around 20,000 atm, a discontinuous shift in the A-band frequency is observed. These shifts are to lower energies for the alkali iodides and to higher energies for the alkali bromides or chlorides. This is possibly related to the much stronger spin-orbital interaction

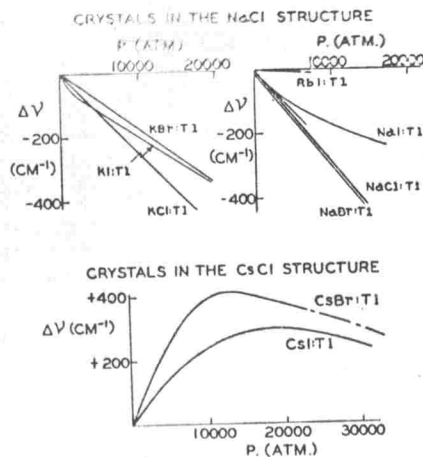


Fig. 2. Initial frequency shift vs. pressure—ten alkali halides activated by Tl⁺.

of the iodide ion, compared to the chloride or bromide.

A study was made to determine if varying the impurity concentration affected the pressure shift of the impurity spectra. Thallium activated potassium iodide, in concentrations from 2×10^{-1} per cent to 4×10^{-3} per cent was used for the study. No dependence on concentration was observed.

Measurements have been made of the spectra of several mixed crystals of potassium bromide and potassium iodide, activated by thallium, and of the effect of pressure on this spectra. The spectral

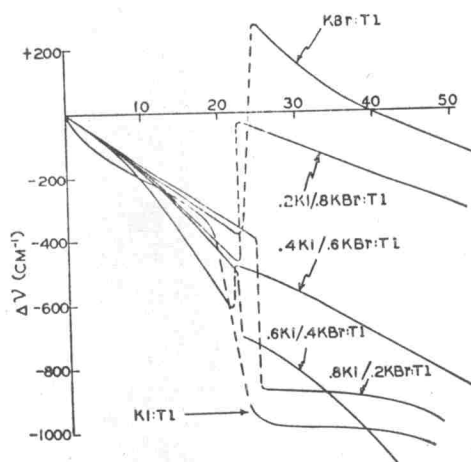


Fig. 3. The effect of pressure on A-band spectra in mixed crystals of KI:Tl and KBr:Tl.