than one covalent bond. Hence the average ionic character of each bond will be 5/6, *i.e.*, 83% which is in good agreement with the values (83—86%) calculated from the partial ionic character of bond energies. Similarly in the case of cœsium chloride each cœsium being surrounded by eight chlorines and forming one covalent bond the partial ionic character should be 7/8=0·875 which compares favourably with the values. ·91, ·93 and ·90 for cœsium chloride, bromide and iodide respectively.

A further support to the partial ionic character of alkali halides comes from the data on magneto-optical anomaly (Faraday effect) of these salts found by Darwin and Watson (1927), ($r = 0·8$) and recently by Ramaseshan (1948), ($r = 0·85$) and from the dielectric constants and dipole moments as shown by us in a previous note.

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IONIC CHARACTER OF HYDROGEN AND ALKALI HALIDES

THE object of the present note is to point a remarkably simple relationship between the internuclear charges and ionic character.

The dipole moment of hydrogen halides in gaseous state as measured by Smyth and Zahn are in agreement with the measurements of dielectric constants of pure solids, liquids and solutions by using a new equation as shown elsewhere. The experimental values of the ionic character are 0·43, 0 17, 0·11 and 0·05 for HF, HCl, HBr and HI respectively.

Table I shows that relationship between ionic character of hydrogen and alkali halides as given by $\frac{Z_A}{Z_A+Z_B} \times n$ where Z_A, Z_B are the nuclear charges and n is a screening constant which is 8/8 for CsF and increases to 8/3. The calculated ionic character of HF (0·267) while in agreement with the bond energy data is lower than the observed value 0·43.

The dipole moments of alkali halides in vapour state have been determined by the molecular beam method. Scheffer's values are $\sqrt{3}$ times lower than those obtained by Rhodebush. No data is available for NaCl and NaBr in vapour state. The calculated values of ionic character $(Z_A/Z_A+Z_B) \times n$ seem tobe in good agreement with ionic characters obtained from Rhodebush's data. In view of the fact that Cs is the most electro-positive and F is the most electro-negative of all the elements, the high value 0·86 for CsF is quite reasonable and is in agreement with the value 0·91 assigned by Smyth.

TABLE I

Ionic Nature of Hydrogen and Alkali Halides (Gases)

Bond	Distance	$\frac{Z_A}{Z_A+Z_B}$	n	Ionic nature: cal. $\frac{Z_A}{Z_A+Z_B} \times n$	Ionic nature: obs. $\frac{\mu}{e.d}$
HF ..	0·92	0·100	8/3	0·267	0·43
HCl ..	1·28	0·0557	,,	0·149	0·17
HBr ..	1·43	0·0278	,,	0·074	0·11
HI ..	1·62	0·0183	,,	0·049	0·052
NaCl ..	2·51	0·393	8/6	0·64	..
NaBr ..	2·64	0·239	8/3	0·64	..
NaI ..	2·90	0·174	,,	0·45	0·35[S]
KCl ..	2·79	0·528	8/6	0·71	0·70[R]
					0·47[S]
KBr ..	2·94	0·350	8/4	0·70	0·77[R]
KI ..	3·23	0·264	8/4	0·71	0·71[R]
					0·44[S]
CsF ..	2·60	0·859	8/8	0·86	0·58[Hu]
					0·91 Smyth
CsI ..	3·41	0·509	8/6	0·68	0·74[R]

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BOND ENERGY AND IONIC CHARACTER OF HYDROGEN AND ALKALI HALIDES

A STRONG support to the values of the ionic character of bonds should naturally come from bond energy data. Considerable amount of work has been done on this