

Alkali metal halide

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Alkali metal halides (also known as **alkali halides**) are the family of inorganic compounds with the chemical formula MX , where M is an alkali metal and X is a halogen. These compounds are the often commercially significant sources of these metals and halides. The best known of these compounds is sodium chloride, table salt.^[1]

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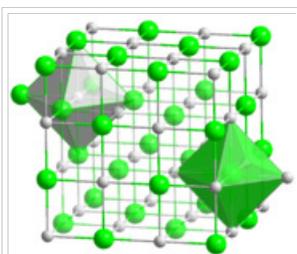
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Halite is the mineral form of sodium chloride.

Structure

Most alkali metal halides crystallize with the face centered cubic lattices. In this structure both the metals and halides feature octahedral coordination geometry, in which each ion has a coordination number of six. Caesium chloride, bromide, and iodide crystallize in a body-centered cubic lattice that accommodates coordination number of eight for the larger metal cation (and the anion also).^[2]



Ball-and-stick model of the coordination of Na and Cl in NaCl. Most alkali metal halides adopt this structure.

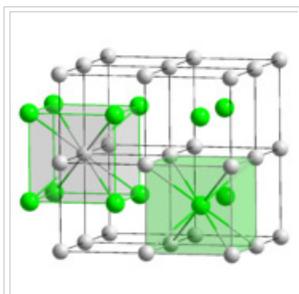
Properties

The alkali metal halides exist as colourless crystalline solids, although as finely ground powders appear white. They melt at high temperature, usually several hundred degrees to colorless liquids. Their high melting point reflects their high lattice energies. At still higher temperatures, these liquids evaporate to give gases composed of diatomic molecules.

These compounds dissolve in polar solvents to give ionic solutions that contain highly solvated anions and cations.

The table below provides links to each of the individual articles for these compounds. The numbers beside the compounds show the electronegativity difference between the elements based on the Pauling scale. The higher the

number is, the more ionic the solid is.



Ball-and-stick model of the coordination of Cs and Cl in CsCl

		<i>Alkali Metals</i>				
		Lithium	Sodium	Potassium	Rubidium	Caesium
<i>H a l o g e n s</i>	Fluorine	LiF (3.0)	NaF (3.1)	KF (3.2)	RbF (3.2)	CsF (3.3)
	Chlorine	LiCl (2.0)	NaCl (2.1)	KCl (2.2)	RbCl (2.2)	CsCl (2.3)
	Bromine	LiBr (1.8)	NaBr (1.9)	KBr (2.0)	RbBr (2.0)	CsBr (2.1)
	Iodine	LiI (1.5)	NaI (1.6)	KI (1.7)	RbI (1.7)	CsI (1.8)

References

- [^] Greenwood, N. N.; & Earnshaw, A. (1997). Chemistry of the Elements (2nd Edn.), Oxford:Butterworth-Heinemann. ISBN 0-7506-3365-4.
- [^] Wells, A.F. (1984) Structural Inorganic Chemistry, Oxford: Clarendon Press. ISBN 0-19-855370-6.

Further reading

- Tastes of the alkali metal halides (except fluorides) (<http://nsrdec.natick.army.mil/LIBRARY/80-89/R81-77.pdf>)

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