

# AS91390 Demonstrate understanding of thermochemical principles and the properties of particles and substances

## Attractive Forces between atoms, molecules and ions

**Metal atoms** lose electrons to form cations – metal elements have a low first ionisation energy

**Non – metal atoms** gain electrons to form anions (negatively charged ions)

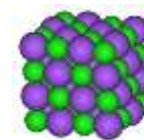
Ionic Bonding

An attraction between oppositely charged ions

Anions = -ve charged

Cations = +ve charged

Ionic lattice



properties

Solution will conduct electricity – ions (charge carriers) are free to move and carry charge.

May be soluble in polar solvents e.g. water

Ions (charge carriers are unable to move) – strongly held in place by electrostatic force of attraction.

Ionic lattice does not conduct electricity

A force will align ions of same charge alongside each other and then repulsion forces crystal planes to part.

Ionic lattice is brittle

Energy is required to separate charged ions from lattice.

High melting and boiling points

Molten ionic compounds conduct electricity as ions are free to move and carry charge.

1																	2												
H																	He												
3	4											5	6							7	8								
Li	Be											B	C	N	O	F	Ne												
9	10											11	12							13	14								
Na	Mg											Al	Si	P	S	Cl	Ar												
17	18											19	20							21	22								
K	Ca											Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
25	26											27	28							29	30	31	32	33	34	35	36		
Rb	Sr											37	38							39	40	41	42	43	44	45	46		
53	54											55	56							57	58	59	60	61	62	63	64		
Cs	Ba	*	57-70	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn										
87	88											89	90							91	92							93	94
Fr	Ra	**	90-102	Lr	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub							Uuq									

Lanthanide series

57	58	59	60	61	62	63	64	65	66	67	68	69	70
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb

Actinide series

89	90	91	92	93	94	95	96	97	98	99	100	101	102
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No