

Chemguide – questions

IONIC BONDING

You will need a copy of the Periodic Table.

1. Solid sodium chloride and solid magnesium oxide are both held together by ionic (electrovalent) bonds.
 - a) Using simple notation (e.g. 2,8,5) write down the symbol for and the electronic configuration of
 - (i) a sodium ion;
 - (ii) a chloride ion;
 - (iii) a magnesium ion;
 - (iv) an oxide ion.
 - b) Explain what holds sodium and chloride ions together in the solid crystal.
 - c) Sodium chloride melts at 1074 K; magnesium oxide melts at 3125 K. Both have identical structures. Why is there such a difference in their melting points?
2. Write down the electronic structures of the following ions. Give the structure in both a simple notation and also the full notation in terms of s, p and d orbitals. For the full notation, you can save time if you want to by using symbols for the noble gases such as [Ar] to represent some of the inner electrons. You can also show all the p electrons (including the outer ones) simply as $3p^6$, for example, rather than showing the p orbitals separately.

So, for example, you would write the structure of a Cu^{2+} ion as 2,8,17 and then either $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9$ or [Ar] $3d^9$.

- a) S^{2-}
- b) F^-
- c) Ca^{2+}
- d) Fe^{2+}
- e) Cr^{3+}
- f) Ni^{2+}
- g) I^-
- h) Sn^{2+}
- i) Sn^{4+}
- j) Te^{2-}
- k) Ag^+

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3. Write the formulae for the following ionic compounds.

a) sodium sulphide

b) caesium bromide

c) magnesium nitride

d) chromium(III) oxide

e) tin(II) chloride

f) nickel(II) selenide

g) aluminium oxide

h) copper(I) iodide