

## 2.2 Ionic Bonding

### Definitions:

- Chemical bond
- Ionic bond
- Formula unit
- Crystal lattice
- Stable octet
- Electron dot diagram
- Lewis symbol

### Explaining the Properties of Ionic Compounds

- An ionic bond is a chemical bond where one compound donates an electron to the other. Typically a metal donates an electron to a non-metal.
- E.g. NaCl (using electron dot diagrams) dissolving in water.
- Properties: solids at SATP, high mp, electrolytes when dissolved in water, hard (brittle)
- Pure ionic compounds are neutral since they contain a balanced number of positive and negative ions.
- Since an ionic compound does not have a true molecular formula we use a formula unit.
- A formula unit is the smallest unit of the compound exhibiting its properties. E.g. NaCl model
- Ions are arranged in a crystal lattice therefore when off set will cleave very easily.

### The Formation of Ionic Compounds

- Usually metals with nonmetals such as oxides and halides (group 17 elements).
- General trends
  - Group 1:  $M_2O$ ,  $M_2X$
  - Group 2:  $MO$ ,  $MX$

### Predicting Common Ions

- Atoms try to gain or lose electrons to gain a stable octet. They try to become iso-electric with a noble gas.
- E.g. Chlorine is in column 17 and would like to gain 1 electron to become iso-electric with Argon to produce an anion with a charge of  $-1$ . It could also lose 7 electrons to become iso-electric with Neon to produce a cation with a charge of  $+7$ . (Note: they tend to take the shortest path to the noble gas)

### Ions and the Human Body

- Very important for good health. See table 1 on page 71.

### Representing Ionic Bonds

- Use electron dot diagrams or Lewis symbols (structures).
- E.g. Period 2 can be found in your textbook on page 72.
- E.g. Formation of  $CaF_2$  (note how brackets are used to show that the atom has a distributed charge for the atom)

### Homework

- Practice Q's: 1,2,3,4,5,8,9,10,11,12,13,14
- Section Q's: 1,2,3,4,5