

Periodicity

- Mendeleev's study of the 64 known elements allowed him to predict the properties of not yet discovered elements. This led to the modern periodic law which states:

if elements are arranged according to their atomic number, a pattern can be seen in which similar properties occur regularly

Why? Has to do with valence e's

Octete Rule - All Noble gases have a full valence shell. For all Noble gases except He, this shell had 8 e's. The Noble gases are very stable and unreactive. All other atoms attempt to achieve the same e configuration for their valence shell as the nearest Noble gas.

Periodic Trends

Ionization Energy (IE) - The minimum amount of energy needed to remove the most loosely bound e from an atom
- when an atom loses an e, it forms a positively charged "ion"

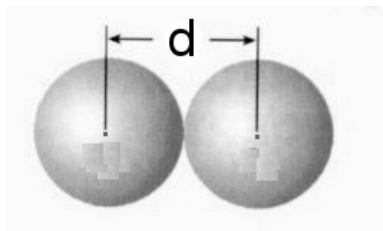
- trends ~ IE increases left to right across the periodic table.

In general, metals have a low IE compared to non-metals and metals tend to form positive ions.

- IE decreases down a group

Atomic Radius (AR)

- Half the distance between two identical atoms measured by taking the distance between the centres of the atoms when they are bonded together



$$AR = \frac{d}{2}$$

- trends
 - ~ AR decreases across a period
 - ~ AR increases down a group

Electron Affinity (EA)

- the energy given off when an atom gains an e
- affection for e's

- trends ~ EA increases across a period therefore non-metals have high EA compared to metals
 - ~ EA decreases down a group