Polarisation and electronegativity

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- Bonds between atoms of a single element, e.g.. Diatomic gases, H2 or O2 can be purely covalent
- Very few compounds are close to purely ionic

- Electronegativity- the ability to attract the bonding electrons in a covalent bond
- Measured using Pauling's scale
- Fluorine is the most electronegative
- Electronegativity increases across periods and decreases down a group
- The covalent bond between two atoms of different electronegativity-> the bonding electrons are pulled towards the more electronegative atom making the bond polar

- Covalent bonds in dipolar atoms have equal electronegativity making them non-polar
- Bonds between different atoms with similar electronegativities are non-polar eg. Carbon and hydrogen
- The greater the difference in electronegativity, the more polar the bond

- Polar bond: differences in electronegativity causes a dipole- difference in charge between two atoms due to shift in electron density

Polar molecules:

- Simple molecule eg. HCl- polar bond gives overall permanent dipole
- Complex molecule eg. CO2 has several polar bonds pointing in different directions- non polar
- All polar bonds point in the same direction- polar molecule
- Lone pairs of electrons on the central atom- no dipole overall

- cations attract electrons from anion

Charge density= charge/volume

-small cations with large charge- very polarising as it has a great charge density

- Large anions with a small charge are easily polarised because they have a low charge density

- If a compound contains a cation which is very polarising and an anion which is easily polarised some of its electron cloud with pull towards the cation causing the anion to distort.
- If polarised enough, it can become covalent with a dipole making it a polar molecule

Increasing positive charge- more polarised anion

- More covalent bond is polarised -> the more ionic character it gains
- More ionic bond is polarised -> the more covalent character it gains