Intermolecular Forces

Intermolecular forces determine bulk properties, such as the melting points of solids and the boiling points of liquids. Liquids boil when the molecules have enough thermal energy to overcome the intermolecular attractive forces that hold them together.

They are electrostatic in nature. They arise from the interaction between positively and negatively charged species. They are both the sum of attractive and repulsive components.

Dipole-Dipole Interactions

Polar covalent bonds behave as if the bonded atoms have localized fractinal charges that are equal but opposite. If a molecular is such that the individual bond dipoles do not cancel each other out (i.e. it is polar) then the molecule has a net dipole moment. These molecules tend to align themselves so that the positive end of one dipole is near the negative end of another and vice-versa.

Any arrangment where the positive and negative ends are adjacent will be more stable than when they are head-to-head. Dipole-Dipole interactions are **attractive** intermolecular forces. Becuase each end of a dipole possesses only a fraction of the charge of an electron, these interactions are substantially weaker than the interactions between two ions. These interactions also fall off much more rapidly with increase in distance.

London Dispersion Forces