

Notes – Intro to Intermolecular Forces

Intermolecular forces are the attractive forces that exist between all molecules and atoms. They are significant only at short distances and are significantly weaker than bonds. Intermolecular forces are consequently most significant in the condensed phases (liquids and solids) and are responsible for the existence of these condensed phases.

Review of Phase properties:

Phase	Density	Shape	Volume	IMF strength
Gas	Low	Indefinite	Indefinite	Weak
Liquid	High	Indefinite	Definite	Moderate
Solid	High	Definite	Definite	High

Intermolecular forces also affect many properties of matter, such as boiling point, melting point, surface tension, adhesion, and cohesion. Let's look at the first two today.

Boiling point is the temperature (at standard pressure) at which a liquid is converted into a gas. It is a physical change meaning that no bonds are broken. What's happening is there is enough energy applied to the substance to overcome the intermolecular forces between the molecules.

Melting point is the temperature at which a solid is converted into a liquid. It is also a physical change meaning that no bonds are broken. Like boiling point, it occurs when there is enough energy applied to a substance to overcome the intense IMF's that exist between molecules.

Thursday, we will explore the different types of intermolecular forces that exist between molecules, but first we will do a lab activity that allows us to use graphing to compare the relative strength of IMFs of different kinds of atoms.

Scientific writing can be broken down into three parts:

Claim: A Statement or conclusion that answers the original question/problem.

Evidence: Scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.

Reasoning: A justification that connects the evidence to the claim. It shows why the data counts as evidence by using appropriate and sufficient scientific principles.

Let's look at an example: Audi commercial. <http://www.edutopia.org/blog/science-inquiry-claim-evidence-reasoning-eric-brunsell>

Let's try an example: Is boiling water a chemical change or a physical change?

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Claim: Boiling water is a physical change

Evidence: Chemical changes involved the re-arrangement of bonds. Physical changes involve a phase change from one state to another and no bonds are broken or formed

Reasoning: Because the water molecules are still intact (no bonds broken or forms), but simple changes from the liquid phase to the gaseous phase, boiling water is an example of a physical change.