

Chapter 2 : Matter and the Atomic Structure

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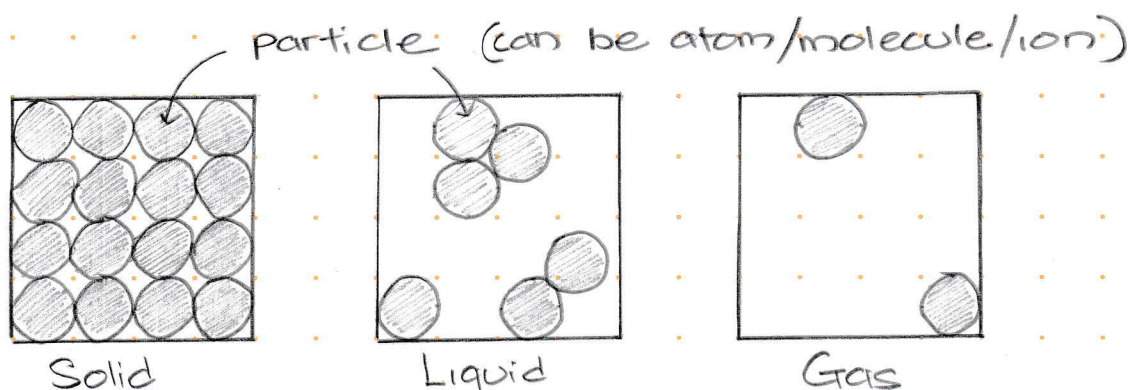
- 2.1 Basic Concepts of Matter
- 2.2 The Development of the Atomic Model
- 2.3 Atomic Structure
- 2.4 Isotopes and Its Uses

2.1 Basic Concepts of Matter

- **Matter** :
 - : is anything that has mass and occupies space
 - : made of particles that are tiny and discrete
 - : exists in 3 states
 - solid (wood table)
 - liquid (drinking water)
 - gas (air)

- **Particle** :
 - : is tiny building block of matter
 - : all matter is made of particles
 - : exists in 3 types
 - atom (carbon atom)
 - molecule (water molecule)
 - ion (table salt, NaCl , Na^+ & Cl^-)

• Three States of Matter

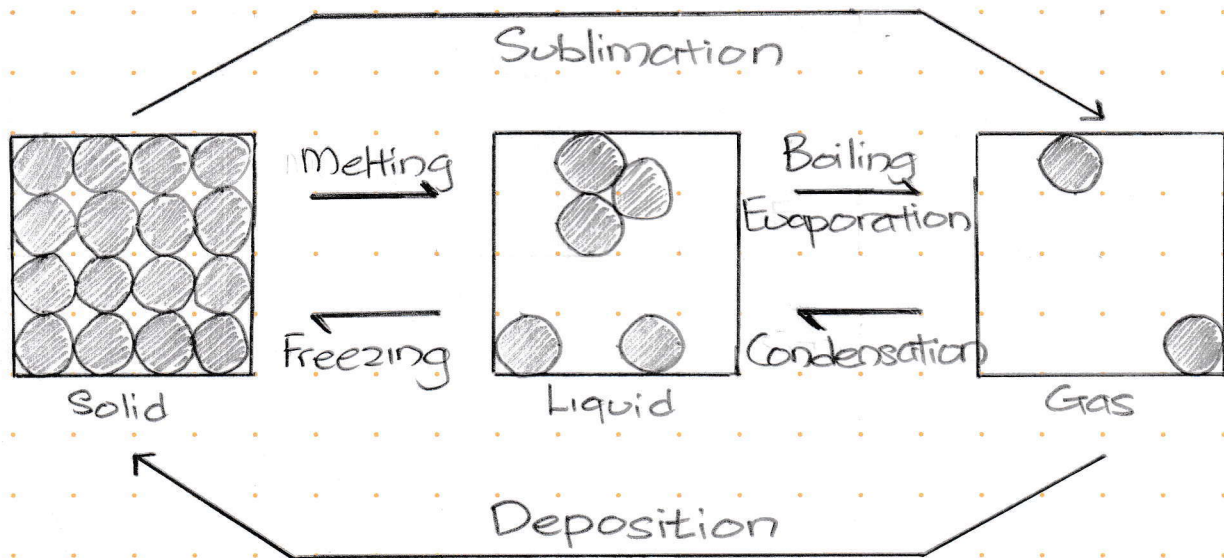


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2.1 Basic Concepts of Matter (cont.)

- Conversion between States of Matter



- Kinetic Particle Theory

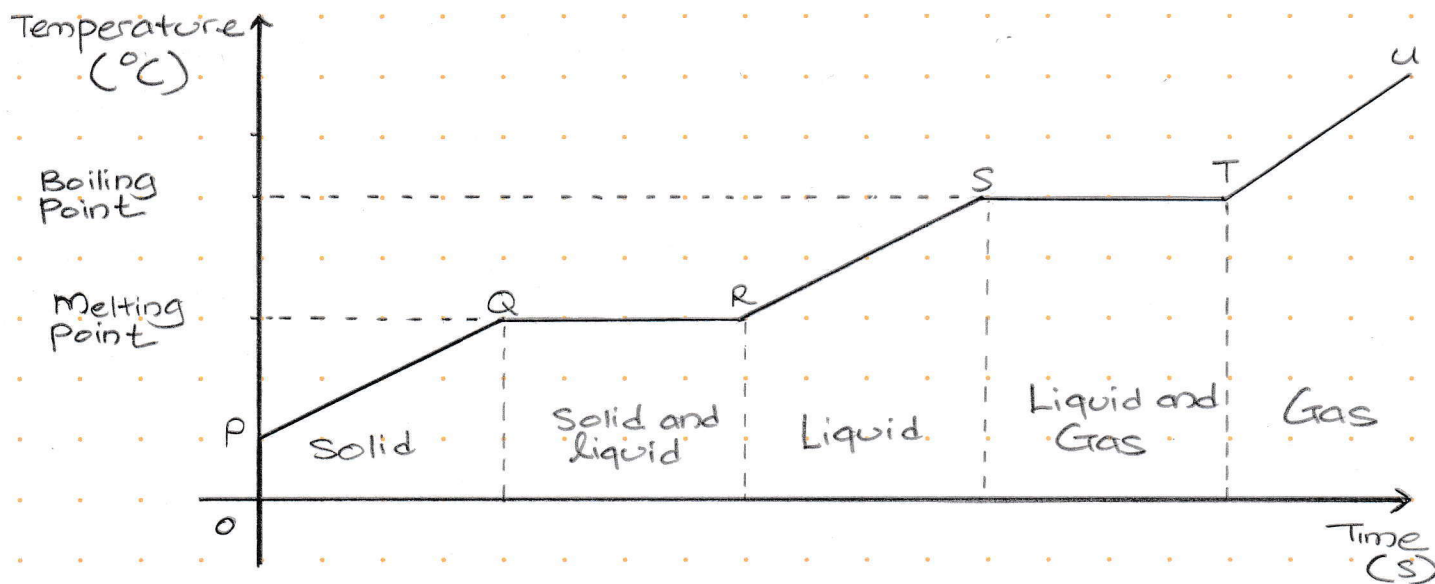
State	Solid	Liquid	Gas
Arrangement	Very closely packed in orderly manner	closely packed	Far Apart
Kinetic Energy	Low	High	Very High
Attraction Force	Strong	Medium	Low
Movement	Vibrate about fixed position	Slide past one another	move freely in all direction

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2.1 Basic Concepts of Matter (Cont.)

• Heating Curve



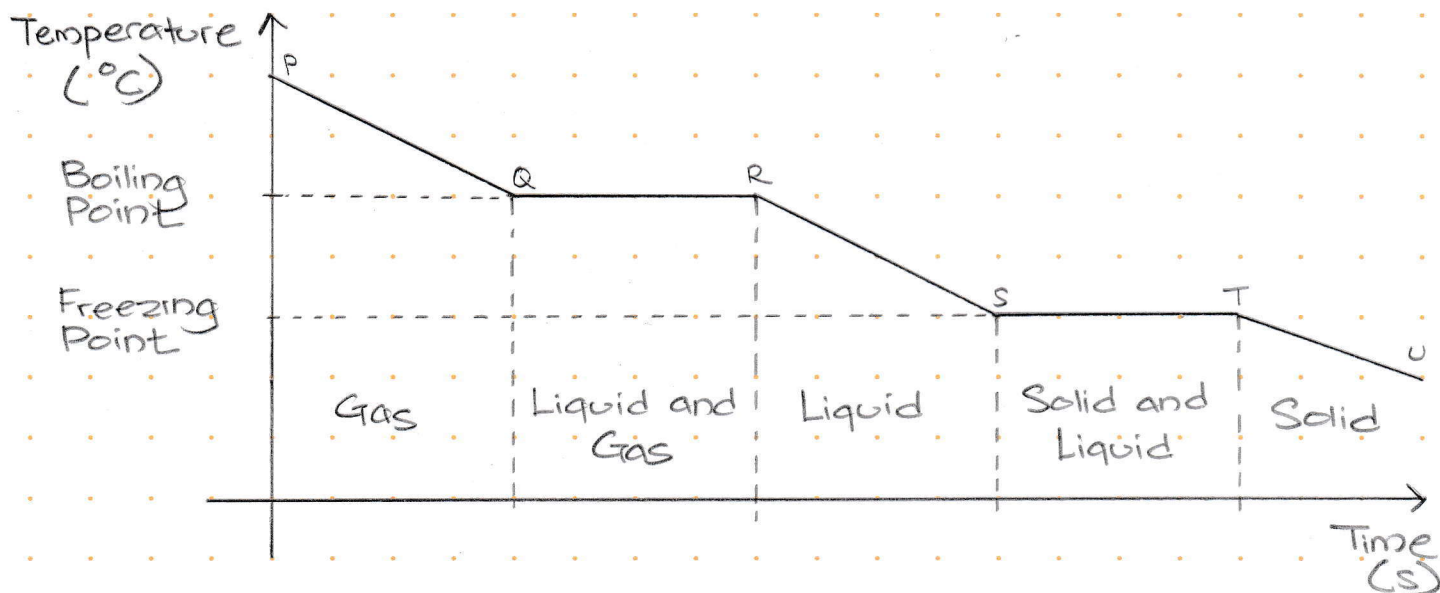
Stage	PQ	QR	RS	ST	TU
Temperature and Kinetic Energy	Increases	Constant	Increases	Constant	Increases
Heat absorbed to:	• ↑ Temp. • ↑ K.E. (particle move faster)	overcome attraction force until S → L	• ↑ Temp. • ↑ K.E.	break bond bet. particles until L → G	• ↑ Temp. • ↑ K.E.
Phase Change	No	Yes	No	Yes	No

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2.1 Basic Concepts of Matter (Cont.)

• Cooling Curve



Stage	PQ	QR	RS	ST	TU
Temperature and Kinetic Energy	Decreases	Constant	Decreases	Constant	Decreases
Heat released to:	• $\downarrow$ Temp. • $\downarrow$ K.E. (particles move slower)	Form the bond bet. particles until $G \rightarrow L$	• $\downarrow$ Temp. • $\downarrow$ K.E.	Form attract. forces bet. particles	• $\downarrow$ Temp. • $\downarrow$ K.E.
Phase Change	No	Yes	No	Yes	No

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2.1 Basic Concepts of Matter (Cont.)

Element	Compound
• a substance made of only one type of atom (pure substance) • one type of atom (one type of element) • cannot be broken down chemically • Ex : Iron (Fe) Oxygen (O_2) Copper (Cu)	• a substance made of two or more elements chemically bonded • two or more different element • can be broken down chemically • Ex : water (H_2O) carbon dioxide (CO_2) salt (NaCl)
Melting Point	Freezing Point
• is a constant temperature when a substance changes from SOLID to LIQUID state at specific pressure	• is a constant temperature when a substance changes from LIQUID to SOLID state at specific pressure