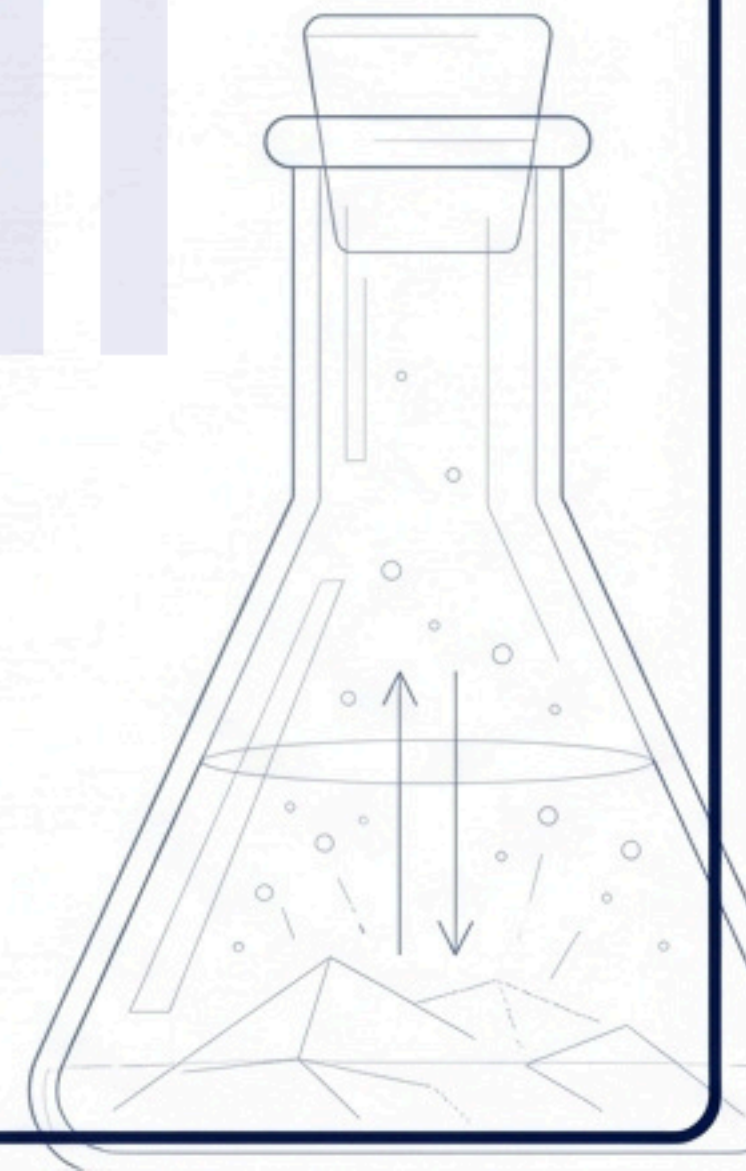


PHYSICAL PROCESSES

Solid-Vapour Equilibrium

Understanding Phase Transformations
in Closed Systems



The Iodine Experiment



Initial State

Solid Iodine (I_2) is placed in a closed, empty vessel.



Sublimation Begins

The solid begins to sublime. The vessel fills with a visible **violet vapour**.



Equilibrium Attained

The intensity of the violet colour increases over time until it becomes completely **constant**.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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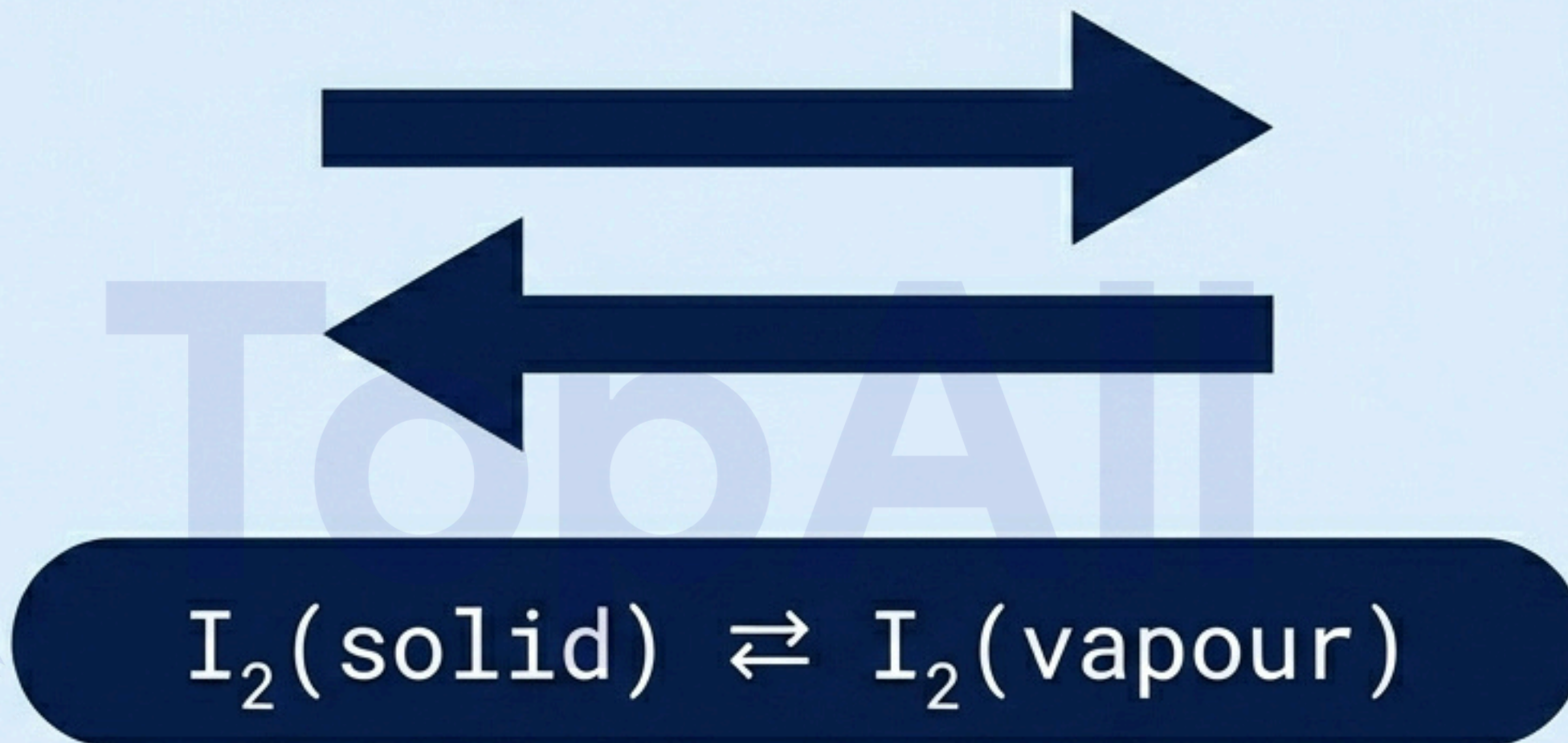
Achieving Dynamic Balance

What is happening?

Forward Process: Solid iodine sublimates into violet vapour.

Reverse Process: Iodine vapour condenses back into solid iodine.

The Balance: Equilibrium is reached when the rate of sublimation exactly equals the rate of condensation.



Exam Tip

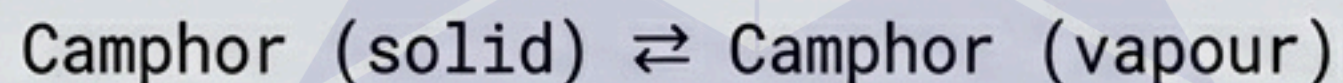
Dynamic, Not Static: Particles are constantly exchanging phases, but the **net** amount of solid and vapour remains unchanged.

Other Common Sublimating Solids

This dynamic balance applies to any solid that sublimates in a closed vessel.



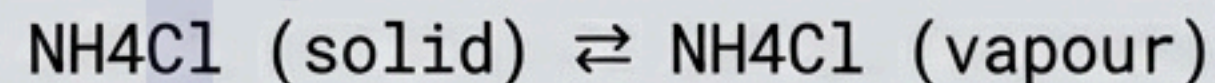
Camphor



*Commonly found in aromatic products
and medicinal rubs.*



Ammonium Chloride



*An inorganic salt that transitions
directly to gas when heated.*

Key Takeaways

Exam Smart

In the iodine system, a constant colour intensity is the definitive proof that equilibrium has been attained.

Once the violet colour stops darkening, the rates of sublimation and condensation are perfectly matched.



Requires a **closed vessel**.



Involves a **phase transformation**
(Solid $\rightleftharpoons$ Gas).



Is a **dynamic, continuous** process.



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