

The Heat Hack for Chemical Equilibrium

Stop memorizing temperature rules. Treat heat as a physical reactant or product.



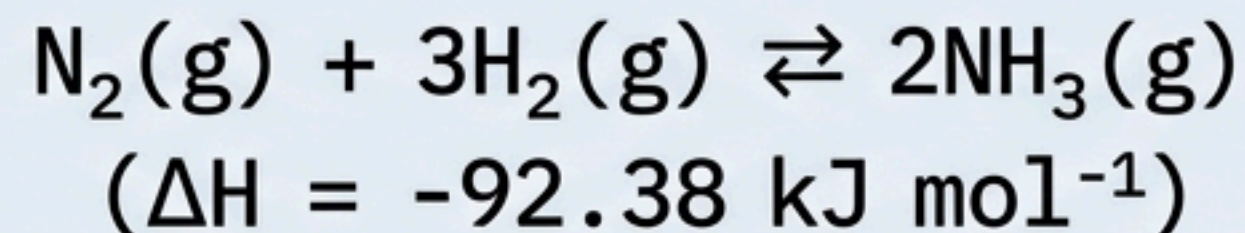
Exothermic = Heat is a Product

When ΔH is negative (exothermic), the system releases energy to its surroundings.

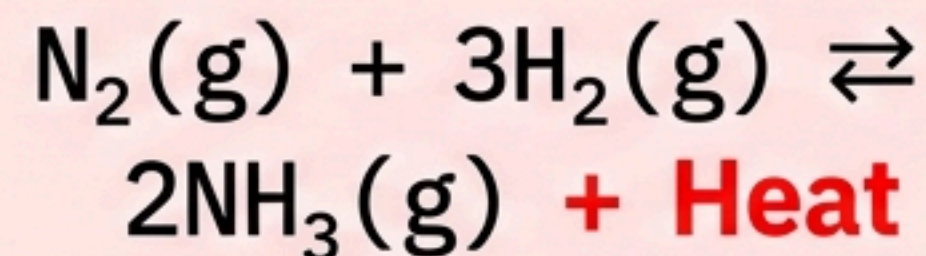
The Hack: Do not just write $\Delta H < 0$. Literally write '+ Heat' on the product side of your equation.



Haber Process Example



Rewritten for Exam



Treating heat as a product makes shift predictions instantly visual.

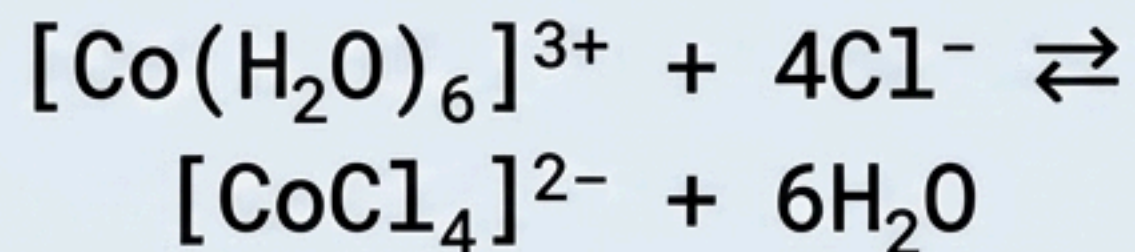
Endothermic = Heat is a Reactant

When ΔH is positive (endothermic), the system absorbs energy to proceed.

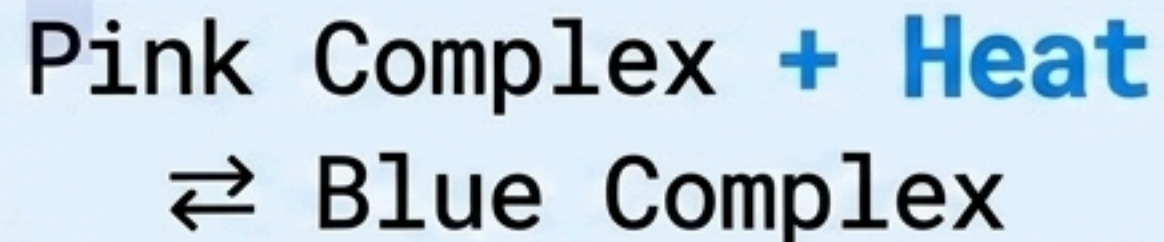
The Hack: Write '+ Heat' on the reactant side of your chemical equation.



Cobalt Complex Example



Rewritten for Exam



Heat acts exactly like a reactant waiting to be consumed.



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

$$E=mc^2$$



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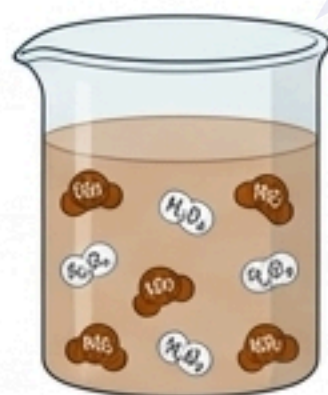
Increasing Temperature: Pushing the Seesaw

SHIFTS LEFT
(Away from Heat)

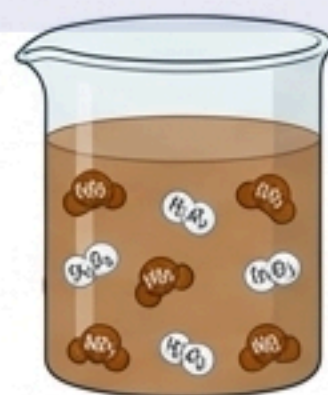


Rule: Adding heat shifts equilibrium **AWAY** from the side with the word 'Heat' to consume the excess.

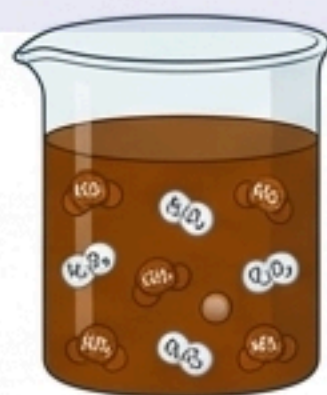
Experimental Evidence Panel



273K (Ice Water)



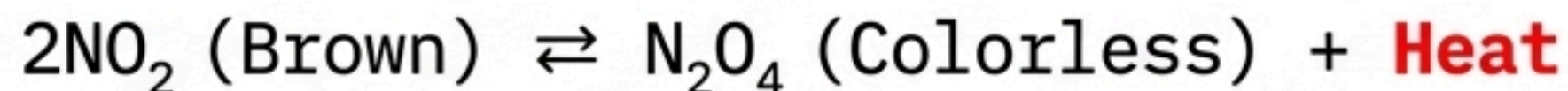
298K (Room Temp)



363K (Hot Water)

Cold

Hot



- In Beaker 3 (Hot Water, 363K), adding heat shifts the reaction Left $\leftarrow$.
- The brown color of NO_2 intensifies.

Decreasing Temperature: Filling the Vacuum



Rule: Removing heat creates a vacuum. Equilibrium shifts TOWARDS the word "Heat" to replace the lost energy.



Industrial Application Panel

Maximizing yield in the Haber Process.



To maximize **NH₃ production** (force a right shift), we must constantly cool the system to remove Heat. Low temperature is favorable for high yield.

JEE Trap Alert: The K_c Illusion



Students often assume temperature acts exactly like adding a chemical—just a temporary shift while K_c remains constant. **THIS IS FALSE.**

Reality Matrix

"When a change in temperature occurs, the value of equilibrium constant, K_c is changed."

Exothermic (Heat on Right)

$T \uparrow \rightarrow$ Shifts Left $\rightarrow K_c$ Decreases $\downarrow$

Endothermic (Heat on Left)

$T \uparrow \rightarrow$ Shifts Right $\rightarrow K_c$ Increases $\uparrow$

Key Takeaway: Only temperature changes the actual mathematical value of the equilibrium constant K_c . Concentration and pressure merely change Q_c .

Exam Snapshot: Temperature & Equilibrium

	Exothermic ($\Delta H < 0$)	Endothermic ($\Delta H > 0$)
The Hack	Reactants $\rightleftharpoons$ Products + Heat	Reactants + Heat $\rightleftharpoons$ Products
Temp Increase ($T \uparrow$)	Shifts Backward K_c Drops 	Shifts Forward K_c Rises 
Temp Decrease ($T \downarrow$)	Shifts Forward K_c Rises 	Shifts Backward K_c Drops 



You've Learned the Theory.

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