

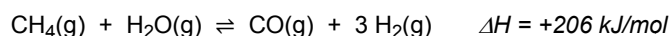


# LE CHATELIER'S PRINCIPLE 1

- 1) Complete the table to show what would happen to the position of the following gas phase equilibria if the following changes were made. Tick the correct column in each case.

Equilibrium	Energy change (forward reaction)	Increase temperature			Increase pressure		
		moves left	no move	move right	moves left	no move	move right
$A(g) + 2 B(g) \rightleftharpoons X(g) + Z(g)$	exothermic						
$P(g) + Q(g) \rightleftharpoons 2 X(g)$	endothermic						
$A_2(g) \rightleftharpoons X(g) + Z(g)$	exothermic						
$2 P(g) \rightleftharpoons 2 C(g) + D(g)$	endothermic						

- 2) The hydrogen used in the Haber process is made in the reaction shown below, which is an equilibrium.



- a) i) If the temperature of this equilibrium was increased, what would happen to the yield of hydrogen?

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- ii) Explain your reasoning. ....

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- b) i) If the pressure of this equilibrium was increased, what would happen to the yield of hydrogen?

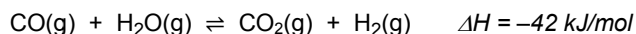
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- ii) Explain your reasoning. ....

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- 3) Hydrogen can also be made in the reaction shown below.



- a) i) If the temperature of this equilibrium was increased, what would happen to the yield of hydrogen?

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- ii) Explain your reasoning. ....

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- b) i) If the pressure of this equilibrium was increased, what would happen to the yield of hydrogen?

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- ii) Explain your reasoning. ....

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