a. $Q = \frac{[CO_2][H_2]}{[CO][H_2O]} \rightarrow \frac{2 \cdot 2}{1} = 4$ > greater than K, which is 1, so

it is product favored and shifts left

i. If $Q < K$, reaction goes to right

ii. If $Q = K$, equilibrium

iii. If $Q > K$, reaction goes to left

$2NO(g) \rightleftharpoons N_2(g) + O_2(g)$, $K = 2.4 \cdot 10^3$

.024 mol 2 mol 2.6 mol

$Q = \frac{[N_2][O_2]}{[NO]^2} \rightarrow \frac{(2)(2.6)}{(.024)^2} = 9028$, $Q > K$ reaction shifts left

Chatelier's Principle

$CO_3(aq) \rightarrow CO_2(g) + H_2O(l)$

f a system at equilibrium undergoes stress, it will respond to vercome the effect of the stress

$_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ at equilibrium

Add a reactant, equilibrium shifts to the right

Remove product, equilibrium shifts to the right

dd product, equilibrium shifts to left

emove reactant, equilibrium shifts to left

$A(g) \rightleftharpoons B(g)$

igher volume/less pressure favors side with more moles

ss volume/more pressure favors side with less moles

anges in Temperature

ndothermic heat is a reactant $(+\Delta H)$

xothermic heat is a product $(-\Delta H)$

$(H_2O)_6^{2+}(aq) + 4Cl^-(aq) \rightleftharpoons CoCl_4^{2-}(aq) + 6H_2O(l)$, $H > 0$

ice, shifts left

eat, shifts right

othermic Reactions

On ice, shifts right

Heat, shifts left

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

	Left	Right	
add N_2		x	
add NH_3	x		
decrease volume		x	
add O_2			→ nothing!
increase temp	x		