Key

4. (6 Pts) Consider the following gas-phase equilibrium reaction:

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$; $K_c = 4.10 \times 10^{-4}$ at 2000°C

If 1.0 mol of NO is introduced into a 1.0 L container at 2000°C, what is the concentration of NO when equilibrium is reached?

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

	N_2	O_2	NO
I.	0	0	1.0 M
C.	+x	+x	−2x
E.	x	x	1.0 − 2x

$$K_c = \frac{[NO]^2}{[N_2][O_2]}$$

$$4.10 \times 10^{-4} = \frac{(1.0-2x)^2}{x^2}$$

$$\sqrt{4.10 \times 10^{-4}} = \frac{1.0-2x}{x}$$

$$0.02024x = 1.0 - 2x$$

$$2.02025x = 1.0$$

$$x = 0.4950$$

$$1.0 - 2(0.4950) = \underline{0.010\ M}$$

5. (4 Pts) Consider the equilibrium: $A(s) \rightleftharpoons B(s) + C(g)$; $\Delta H°_{rxn} > 0$ $\Delta H = (+)$

A + heat ⇌ B(s) + C(g)

Predict and explain how or whether the following actions would affect this equilibrium.

a. adding more solid A No effect (solids do not effect Eq)

b. lowering the temperature More A (since RXN is endothermic, heat is a reactant)

c. increasing the pressure on the system by reducing its volume

More A (since conc. of $C_{(g)}$ is increased

d. adding helium gas to increase the total pressure

no effect (the partial pressure of $C_{(g)}$ does not change.