

Wkst 2.2: I. R. E. Analysis

1-	$2 \text{Al}_2\text{S}_3(\text{g})$	+	$9 \text{O}_2(\text{g})$	\rightleftharpoons	$2 \text{Al}_2\text{O}_3(\text{g})$	+	$6 \text{SO}_2(\text{g})$
Initial	26 M		20. M		16 M		18 M
Reaction	+ 2 M		+ 9 M	\leftarrow	- 2 M		- 6 M
Equilibrium	28 M		29 M		14 M		12 M

$$K_{352^\circ\text{C}} = 5.1 \times 10^{-8}$$

2-	$4 \text{BH}_3(\text{g})$	+	$\text{P}_4(\text{g})$	\rightleftharpoons	$6 \text{H}_2(\text{g})$	+	$4 \text{BP}(\text{g})$
Initial	14 M		22 M		9 M		17 M
Reaction	- 4 M		- 1 M	\rightarrow	+ 6 M		+ 4 M
Equilibrium	10. M		21 M		15 M		21 M

$$K_{450\text{K}} = 1.1 \times 10^7$$

3-	$2 \text{C}_5\text{H}_{10}(\text{g})$	+	$15 \text{O}_2(\text{g})$	\rightleftharpoons	$10 \text{CO}_2(\text{g})$	+	$10 \text{H}_2\text{O}(\text{l})$
Initial	3.60 M		1.50 M		6.50 M		X
Reaction	+ 0.220 M		+ 1.65 M	\leftarrow	- 1.10 M		X
Equilibrium	3.82 M		3.15 M		5.40 M		X

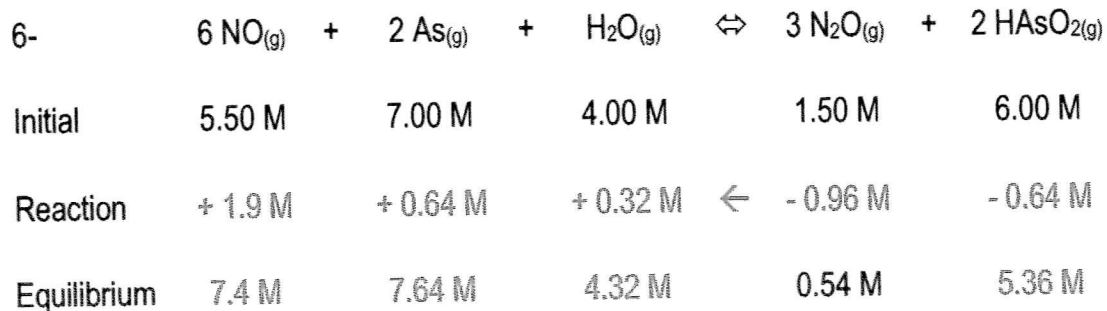
$$K_{290\text{K}} = 4.84 \times 10^{-2}$$



$$K = 50.$$



$$K = 5.4 \times 10^2$$



$$K = 1.1 \times 10^{-7}$$



$$K_{515\text{K}} = 0.250$$

Determine $[\text{SiH}_4]_e$, $[\text{O}_2]_e$, $[\text{H}_2\text{O}]_e$, $[\text{SiO}_2]_e$

Setting limits: $13 \text{ M} > y > 0 \text{ M}$

$$K = \frac{[\text{SiO}_2] [\text{H}_2\text{O}]^2}{[\text{SiH}_4] [\text{O}_2]^2}$$

$$0.250 = \frac{(16 - y) (26 - 2y)^2}{(y) (21 + 2y)^2}$$

Using trial and error and ignoring sig. figs., we get

$$[\text{SiH}_4]_e \approx 6.25 \text{ M}$$

$$[\text{O}_2]_e \approx 33.5 \text{ M}$$

$$[\text{SiO}_2]_e \approx 9.75 \text{ M}$$

$$[\text{H}_2\text{O}]_e \approx 13.5 \text{ M}$$