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For the reaction, $2H_2S_{(g)} \rightleftharpoons 2H_{2(g)} + 1S_{2(g)}$ $K_{eq} = 2.34E-4$. If the equilibrium concentrations of H_2S and H_2 are 0.15M and 0.010M respectively, what is equil. concentration of S_2?

Step 1 $2H_2S_{(g)} \rightleftharpoons 2H_{2(g)} + S_{2(g)}$

Step 2 $$K = \frac{[H_{2(g)}]_E^2 \cdot [S_{2(g)}]_E^1}{[H_2S_{(g)}]_E^2}$$

If 1 or 5, $[\ ] = 1$

rewrite without it.

rewrite

$$[S_{2(g)}]_E^1 = \frac{K \cdot [H_2S_{(g)}]_E^2}{[H_{2(g)}]_E^2}$$

Step 3

Define variables

$K = 2.3E-4\ M$

$K = \frac{M^2 \cdot M^1}{M^2} = M$

$[H_2S]_E = 0.15M$

$[H_2]_E = 0.01M$

$[S_2]_E = ?$

$$[S_2]_E = \frac{(2.3\times10^{-4}M)(0.15M)^2}{(0.01M)^2}$$

$$= 0.05175M$$

$$[S_2]_E = 0.0518M$$