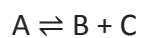


Answer on Question #52688, Chemistry, Other

Question:

For the reaction:



the equilibrium constant is 3.0×10^{-6} . What is the concentration of B at equilibrium if A was originally 0.10 M?

Answer:

Initial concentrations:

$$[A]=0.1\text{M}$$

$$[B]=0\text{M}$$

$$[C]=0\text{M}$$

When the system reaches equilibrium, we assume that X moles of A are used up but 0.1-x moles remain. This produces X moles of B and X moles of C

Equilibrium concentrations:

$$[A]=0.1-X$$

$$[B]=X$$

$$[C]=X$$

$$K_c = \frac{[B][C]}{[A]} = \frac{x^2}{(0.1-x)} = 3 \times 10^{-6}$$

At this point I'm going to make an assumption that, since K_c is so small, then $(0.1-x) \approx 0.1$.

$$x^2 = 3 \times 10^{-6} \times 0.1 = 3 \times 10^{-7}$$

$$x = [B] = \sqrt{3 \times 10^{-7}} = 5.48 \times 10^{-4}\text{M}$$