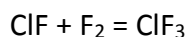
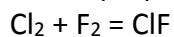


Question #70782, Chemistry / General Chemistry

Dear expert, please provide an answer to the question below within 12 hours.

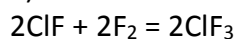
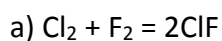
ClF₃ is prepared via a two-step fluorination of chlorine gas:



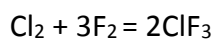
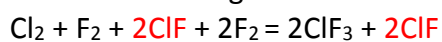
a) balance each step and write the overall equation.

b) Show that the overall K_c equals the product of the K_c's for the individual steps

Answer :



Sum of both will give overall reaction:



b) overall K_c:

$$K_c = \frac{[\text{ClF}_3]^2}{[\text{Cl}_2][\text{F}_2]^3}$$

By steps:

$$K_{c1} = \frac{[\text{ClF}]^2}{[\text{Cl}_2][\text{F}_2]^2}$$

$$K_{c2} = \frac{[\text{ClF}_3]^2}{[\text{F}_2][\text{ClF}]^2}$$

$$K_{c1} \times K_{c2} = \frac{[\text{ClF}]^2}{[\text{Cl}_2][\text{F}_2]^2} \times \frac{[\text{ClF}_3]^2}{[\text{F}_2][\text{ClF}]^2} = \frac{[\text{ClF}_3]^2}{[\text{Cl}_2][\text{F}_2]^2[\text{F}_2]} = \frac{[\text{ClF}_3]^2}{[\text{Cl}_2][\text{F}_2]^3} = K_c$$

Answer provided by <https://www.AssignmentExpert.com>