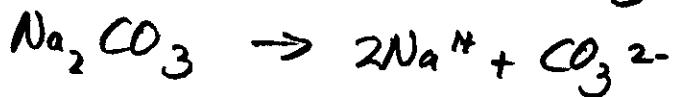
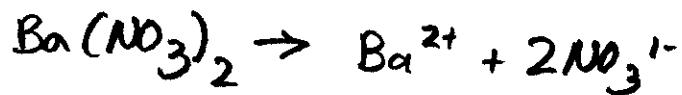


Complex K_{sp} problem - find K_{sp} value

e.g. 400 mL of 0.0001M $\text{Ba}(\text{NO}_3)_2$ is mixed with 500 mL of 0.0003M Na_2CO_3 . 2.244 mg of ppt forms. Find K_{sp} for the ppt produced

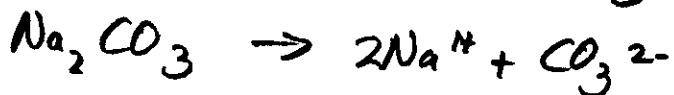
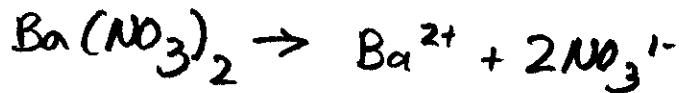
Complex K_{sp} problem - find K_{sp} value

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Complex K_{sp} problem - find K_{sp} value

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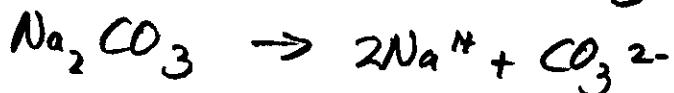
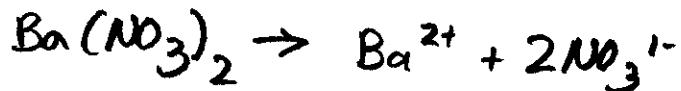


Initial []	/	/	/
Initial Amount			
Final Amount			
Final []			

$$400\text{mL} + 500\text{mL} = 900\text{mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9\text{L}$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced

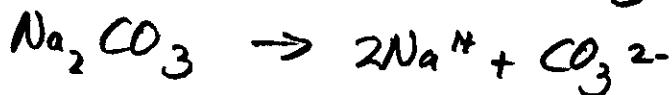
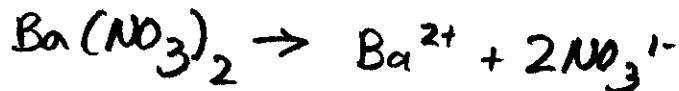


Initial []	/	/	/
Initial Amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final Amount			
Final []			

$$400 \text{ mL} + 500 \text{ mL} = 900 \text{ mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9 \text{ L}$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced



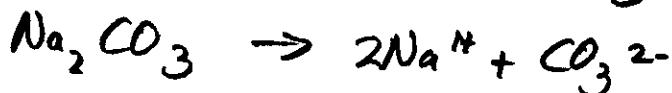
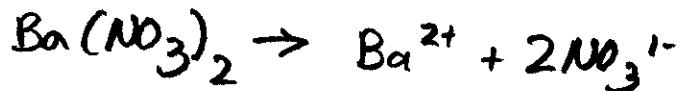
Initial []	/	/	/
Initial amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final amount	$1.137 \times 10^{-5} \text{ mol}$		
Final []			

$$400 \text{ mL} + 500 \text{ mL} = 900 \text{ mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9 \text{ L}$$

$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced



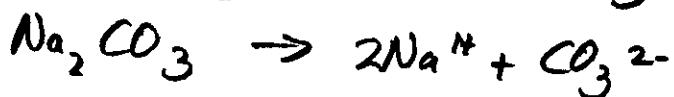
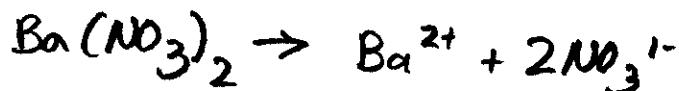
Initial []	/	/	/
Initial amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final amount	$1.137 \times 10^{-5} \text{ mol}$	4×10^{-5} -1.137×10^{-5} $= 2.863 \times 10^{-5} \text{ mol}$	1.5×10^{-4} -1.137×10^{-5} $= 1.386 \times 10^{-4} \text{ mol}$
Final []			

$$400 \text{ mL} + 500 \text{ mL} = 900 \text{ mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9 \text{ L}$$

$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced



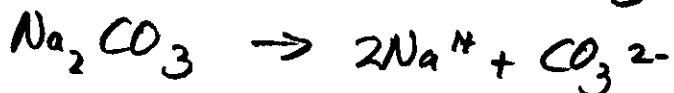
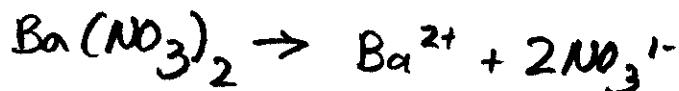
Initial []	/	/	/
Initial amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final amount	$1.137 \times 10^{-5} \text{ mol}$	4×10^{-5} -1.137×10^{-5} $= 2.863 \times 10^{-5} \text{ mol}$	1.5×10^{-4} -1.137×10^{-5} $= 1.386 \times 10^{-4} \text{ mol}$
Final []	N.A.	$3.181 \times 10^{-5} \text{ M}$	$1.540 \times 10^{-4} \text{ M}$

$$400 \text{ mL} + 500 \text{ mL} = 900 \text{ mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9 \text{ L}$$

$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced



Initial []	/	/	/
Initial amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final amount	$1.137 \times 10^{-5} \text{ mol}$	4×10^{-5} -1.137×10^{-5} $= 2.863 \times 10^{-5} \text{ mol}$	1.5×10^{-4} -1.137×10^{-5} $= 1.386 \times 10^{-4} \text{ mol}$
Final []	N.A.	$3.181 \times 10^{-5} \text{ M}$	$1.540 \times 10^{-4} \text{ M}$

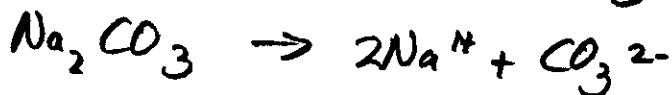
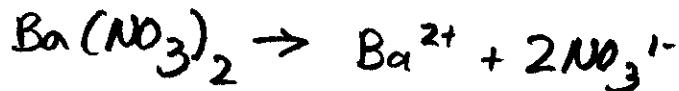
$$400 \text{ mL} + 500 \text{ mL} = 900 \text{ mL} \rightarrow \\ \therefore \text{Total Volume} : 0.9 \text{ L}$$

$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

$$K_{\text{sp}} = [\text{Ba}^{2+}][\text{CO}_3^{2-}]$$

Complex K_{sp} problem - find K_{sp} value

eg 400 mL of 0.0001M Ba(NO₃)₂ is mixed with 500 mL of 0.0003M Na₂CO₃. 2.244 mg of ppt forms. Find K_{sp} for the ppt produced



Initial []	/	/	/	400mL + 500mL = 900mL ∴ Total Volume: 0.9L
Initial Amount	0	n=CV n=0.0001M x 0.4L n = 4x10 ⁻⁵ mol	n=CV n = 0.0003M x 0.5L n = 1.5x10 ⁻⁴ mol	
Final Amount	1.137x10 ⁻⁵ mol	4x10 ⁻⁵ -1.137x10 ⁻⁵ = 2.863x10 ⁻⁵ mol	1.5x10 ⁻⁴ -1.137x10 ⁻⁵ = 1.386x10 ⁻⁴ mol	
Final []	N.A.	3.181x10 ⁻⁵ M	1.540x10 ⁻⁴ M	

$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

$$K_{\text{sp}} = [\text{Ba}^{2+}][\text{CO}_3^{2-}]$$

$$K_{\text{sp}} = (3.181 \times 10^{-5})(1.540 \times 10^{-4})$$

$$K_{\text{sp}} = 4.9 \times 10^{-9}$$