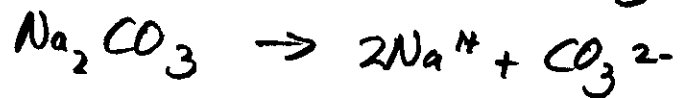
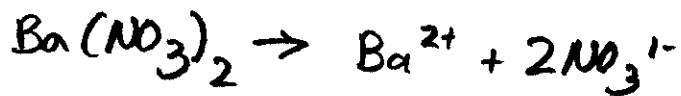


Complex K_{sp} problem - find K_{sp} value.

eg 400 mL of 0.0001M $Ba(NO_3)_2$ is mixed with
500 mL of 0.0003M Na_2CO_3 . 2.244 mg of ppt
forms. Find K_{sp} for the ppte produced

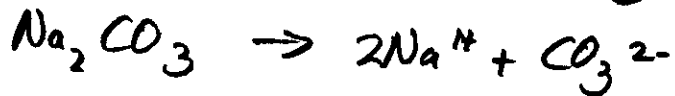
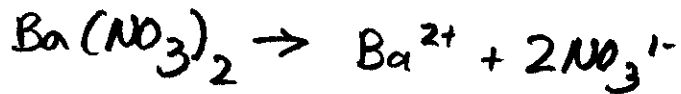
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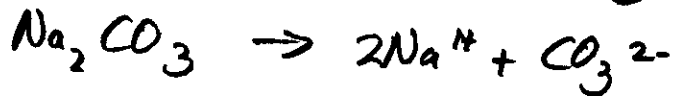
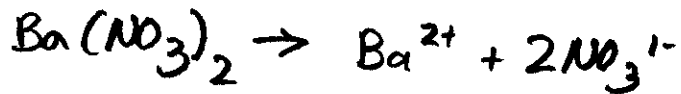


Initial []	/	/	/
Initial Amount			
Final Amount			
Final []			

400 mL + 500 mL = 900 mL
 \therefore Total Volume = 0.9 L

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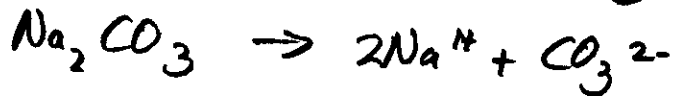
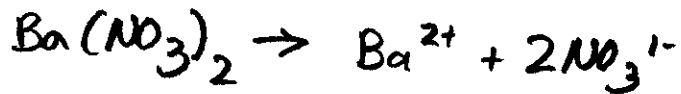


Initial []	/	/	/
Initial Amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final Amount			
Final []			

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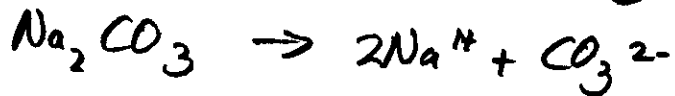
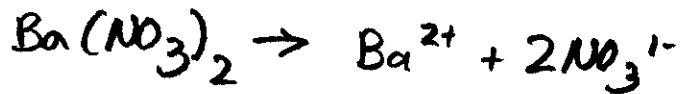
Initial []	/	/	/
Initial Amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final Amount	$1.137 \times 10^{-5} \text{ mol}$		
Final []			

400 mL + 500 mL = 900 mL
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$$2.244 \text{ mg BaCO}_3 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol BaCO}_3}{197.34 \text{ g BaCO}_3} = 1.137 \times 10^{-5} \text{ mol BaCO}_3$$

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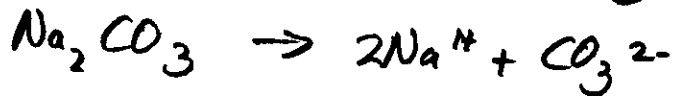
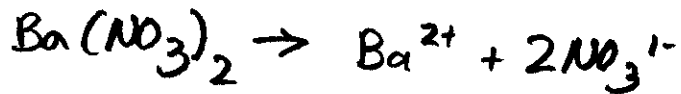
Initial []	/	/	/
Initial Amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final Amount	$1.137 \times 10^{-5} \text{ mol}$	4×10^{-5} $- 1.137 \times 10^{-5}$ $= 2.863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

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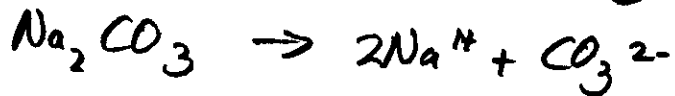
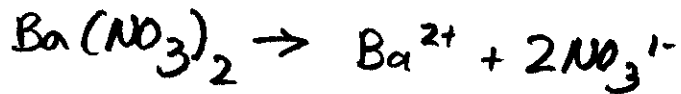
Initial []	/	/	/
Initial Amount	0	$n = CV$ $n = 0.0001 \text{ M} \times 0.4 \text{ L}$ $n = 4 \times 10^{-5} \text{ mol}$	$n = CV$ $n = 0.0003 \text{ M} \times 0.5 \text{ L}$ $n = 1.5 \times 10^{-4} \text{ mol}$
Final Amount	$1.137 \times 10^{-5} \text{ mol}$	4×10^{-5} $- 1.137 \times 10^{-5}$ $= 2.863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

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



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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} $- 1.137 \times 10^{-5}$ $= 2.863 \times 10^{-5} \text{ mol}$	1.5×10^{-4} $- 1.137 \times 10^{-5}$ $= 1.386 \times 10^{-4} \text{ mol}$
Final []	N.A.	$3.181 \times 10^{-5} \text{ M}$	$1.540 \times 10^{-4} \text{ M}$

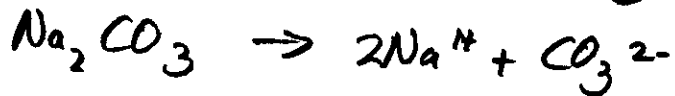
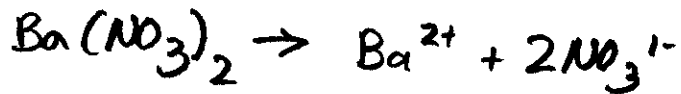
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$$K_{sp} = [\text{Ba}^{2+}][\text{CO}_3^{2-}]$$

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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} $- 1.137 \times 10^{-5}$ $= 2.863 \times 10^{-5} \text{ mol}$	1.5×10^{-4} $- 1.137 \times 10^{-5}$ $= 1.386 \times 10^{-4} \text{ mol}$
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$$K_{sp} = [\text{Ba}^{2+}][\text{CO}_3^{2-}]$$

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

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