

Prelab Assignment – Experiment 4: Qualitative Analysis of Cations, Week 1

Balance each chemical reaction given in Appendix 1 (the reactions are reproduced below). Remember to balance for both mass and charge. For Equation 16, show your work on how you arrived at your balanced equation.

1. $\text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl}(\text{s})$
2. $\text{Ag}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{AgOH}(\text{s})$
3. $\text{Cu}^{+2}(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s})$
4. $\text{Fe}^{+3}(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Fe}(\text{OH})_3(\text{s})$
5. $\text{Cr}^{+3}(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Cr}(\text{OH})_3(\text{s})$
6. $\text{Zn}^{+2}(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Zn}(\text{OH})_2(\text{s})$
7. $\text{Cu}^{+2}(\text{aq}) + \text{NH}_3(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{Cu}(\text{OH})_2(\text{s}) + \text{NH}_4^+(\text{aq})$
8. $\text{Fe}^{+3}(\text{aq}) + \text{NH}_3(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{Fe}(\text{OH})_3(\text{s}) + \text{NH}_4^+(\text{aq})$
9. $\text{Cr}^{+3}(\text{aq}) + \text{NH}_3(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{Cr}(\text{OH})_3(\text{s}) + \text{NH}_4^+(\text{aq})$
10. $\text{Zn}^{+2}(\text{aq}) + \text{NH}_3(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{Zn}(\text{OH})_2(\text{s}) + \text{NH}_4^+(\text{aq})$
11. $\text{Cr}(\text{OH})_3(\text{s}) + \text{OH}^-(\text{aq}) \rightarrow \text{Cr}(\text{OH})_4^-(\text{aq})$
12. $\text{Zn}(\text{OH})_2(\text{s}) + \text{OH}^-(\text{aq}) \rightarrow \text{Zn}(\text{OH})_4^{2-}(\text{aq})$
13. $\text{Cu}(\text{OH})_2(\text{s}) + \text{NH}_3(\text{aq}) \rightarrow \text{Cu}(\text{NH}_3)_4^{+2}(\text{aq}) + \text{OH}^-(\text{aq})$
14. $\text{Zn}(\text{OH})_2(\text{s}) + \text{NH}_3(\text{aq}) \rightarrow \text{Zn}(\text{NH}_3)_4^{+2}(\text{aq}) + \text{OH}^-(\text{aq})$
15. $\text{Ba}^{+2}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{BaSO}_4(\text{s})$
16. $\text{Cr}(\text{OH})_4^-(\text{aq}) + \text{H}_2\text{O}_2(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{CrO}_4^{2-}(\text{aq}) + \text{H}_2\text{O}$
17. $\text{Zn}^{+2}(\text{aq}) + \text{K}^+(\text{aq}) + \text{Fe}(\text{CN})_6^{4-}(\text{aq}) \rightarrow \text{Zn}_3\text{K}_2[\text{Fe}(\text{CN})_6]_2(\text{s})$
18. $\text{Cu}^{+2}(\text{aq}) + \text{Fe}(\text{CN})_6^{4-}(\text{aq}) \rightarrow \text{Cu}_2\text{Fe}(\text{CN})_6(\text{s})$
19. $\text{CrO}_4^{2-}(\text{aq}) + \text{Ba}^{+2}(\text{aq}) \rightarrow \text{BaCrO}_4(\text{s})$
20. $\text{Fe}^{+3}(\text{aq}) + \text{SCN}^-(\text{aq}) \rightarrow \text{FeSCN}^{+2}(\text{aq})$

Your work for the balance of Equation 16: