

Maryam Yamadi 09/05 Lab Notebook

-Prepare 5mM NaOH solution (by dilution)

5mM NaOH = 5×10^{-3} M NaOH

$(5 \times 10^{-3} \text{ M NaOH}) \times (0.05 \text{ L}) / (1 \text{ M stock NaOH}) = 2.5 \times 10^{-4} \text{ L} = \mathbf{0.25 \text{ mL stock NaOH to 49.75 mL H}_2\text{O}}$

-Remake solutions with low Au:amino acid ratios over different pH range

Ratio	Au	AA	NaOH	H2O	theoretical pH
1_1_1 (dilute)	1mL	1mL	1mL	7mL	10.3979
1_1_0.1 (stock)	1mL	1mL	0.1mL	7.9mL	11.989
1_1_1 (stock)	1mL	1mL	1mL	7mL	12.9989
1_1_0.5 (dilute)	1mL	1mL	0.5mL	7.5mL	7

-Theoretical pH calculation for 1:1:1 ratio of 5mM NaOH diluted solution

$(1 \times 10^{-3} \text{ L}) \times (5 \times 10^{-3} \text{ M NaOH}) = 5 \times 10^{-6} \text{ mol OH}$

$(1 \times 10^{-3} \text{ L}) \times (2.5 \times 10^{-3} \text{ M HAuCl}_4) = 2.5 \times 10^{-6} \text{ mol H}$

$(5 \times 10^{-6} \text{ mol OH}) - (2.5 \times 10^{-6} \text{ mol H}) = 2.5 \times 10^{-6} \text{ xs mol OH}$

$(2.5 \times 10^{-6} \text{ xs mol OH}) / (10 \times 10^{-3} \text{ L}) = 2.5 \times 10^{-4} \text{ M OH}$

$\text{pOH} = -\log[\text{OH}] = -\log[2.5 \times 10^{-4}] = 3.602059$

pH = 14 - pOH = 14 - 3.60 = 10.3979

-Theoretical pH calculation for 1:1:0.1 ratio of 1M NaOH stock solution

$2.5 \times 10^{-6} \text{ mol H}$

$(0.1 \times 10^{-3} \text{ L}) \times (1 \text{ M NaOH}) = 0.1 \times 10^{-3} \text{ mol OH}$

$(0.1 \times 10^{-3} \text{ mol OH}) - (2.5 \times 10^{-6} \text{ mol H}) = 9.75 \times 10^{-5} \text{ xs mol OH}$

$(9.75 \times 10^{-5} \text{ xs mol OH}) / (10 \times 10^{-3} \text{ L}) = 0.00975 \text{ M OH}$

$\text{pOH} = -\log[\text{OH}] = -\log[0.00975] = 2.01099$

pH = 14 - pOH = 14 - 2.0199 = 11.989

-Theoretical pH calculation for 1:1:1 ratio of 1M NaOH stock solution

2.5×10^{-6} mol H

$(1 \times 10^{-3} \text{L}) \times (1 \text{M NaOH}) = 1 \times 10^{-3} \text{mol OH}$

$(1 \times 10^{-3} \text{mol OH}) - (2.5 \times 10^{-6} \text{mol H}) = 9.975 \times 10^{-4} \text{xs mol OH}$

$(9.975 \times 10^{-4} \text{xs mol OH}) / (10 \times 10^{-3} \text{L}) = 0.09975 \text{ M OH}$

$\text{pOH} = -\log[\text{OH}] = -\log[0.09975] = 1.00108$

$\text{pH} = 14 - \text{pOH} = 14 - 1.00108 = 12.9989$

-Theoretical pH calculation for 1:1:0.5 ratio of 5mM NaOH diluted solution

2.5×10^{-6} mol H

$(0.5 \times 10^{-3} \text{L}) \times (5 \times 10^{-3} \text{M NaOH}) = 2.5 \times 10^{-6} \text{mol OH}$

no xs moles reacting meaning the **pH=7**

-Titrant Standardization

- 0.01g KPhth in 30mL H₂O in which phenolphthalein was added
- $(200 \times 10^{-6})(0.25 \text{L}) / (5 \times 10^{-3}) = 0.01 \text{L of 5mM NaOH}$