

LABORATORY EXPERIMENT: STRENGTH OF LAUNDRY BLEACH

Pre-Laboratory Assignment:



- Obtain balanced equations for the following oxidation-reduction reactions that you will encounter in this experiment:
 - The reduction of ClO^- by I^- in acidic solution
 - The reduction of I_2 by $\text{S}_2\text{O}_3^{2-}$ in acidic solution.
- What stoichiometric ratio will allow you to calculate the number of moles of ClO^- ions from the number of moles of $\text{S}_2\text{O}_3^{2-}$ ions used in the titration?
- A 10.0 ml sample of aqueous NaOCl is treated with an excess of KI in acidic solution. The quantity of I_2 that is liberated is such that 28.02 ml of 0.0250 M $\text{Na}_2\text{S}_2\text{O}_3$ solution must be added to cause the disappearance of the dark color due to the starch indicator. What is the molarity of the NaOCl solution?

Sample Data Table:

Quantitative Dilution of Bleach:

Bleach Dilution		Trial Titration	
Final buret reading (ml):		Volume of diluted bleach (ml):	
Initial buret reading (ml):		Final buret reading (ml):	
Volume of undiluted bleach (ml):		Initial buret reading (ml):	
		Volume of 0.0250M $\text{Na}_2\text{S}_2\text{O}_3$ (ml):	

Exact Titrations Trials	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Volume of diluted bleach (ml):				
Final buret reading (ml):				
Initial buret reading (ml):				
Volume of 0.0250 M $\text{Na}_2\text{S}_2\text{O}_3$ (ml):				
*Moles of $\text{Na}_2\text{S}_2\text{O}_3$ (mol):				
* Moles of NaOCl (mol):				
*Molarity of NaOCl in diluted bleach: (M):				
*Mean molarity of NaOCl (M):				
*Show calculations for trial 1 only with your data				

Conclusion Questions:

- Calculate the molarity of the undiluted bleach solution.
- Commercial bleaches such as Clorox are said to contain 5.25% NaOCl by weight. Is this claim correct? Use your results and a density of 1.0 g/ml in your calculations. These calculations should reflect the precision of the assumed density.
- Redo the third problem of the Pre-laboratory assignment, substituting NaIO_3 (sodium iodate) for NaOCl . The new reaction yields I_2 as the only product containing a halogen.