Chem lab 1007 : Oxidation - Reduction Titration (Analysis of Bleach)
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Purpose: To understand how redox reactions can be used to solve calculations.

Procedure: Refer to lab Manual # 7: Oxidation - Reduction Titration (Analysis of Bleach)

Reference : Lund. K, Experiment #7 Oxidation - Reduction Titration (Analysis of Bleach), Chem 1007 Lab Manual, Nipissing University.

Materials :

Tabel.1: Part A Standardization of sodium thiosulfate

Trail #	Initial Volume	End Volume	Volume used	[sodium Thiosulfate]
Trail #1	0.9ml	22.6	21.7	4.15x10^-5
Trail #2	22.6ml	40.5	17.9	5.03x10^-5
Trail #3	66.4ml	44.2	22.2	4.05x20^-5

	Average concentration	Standard deviation
Sodium Thiosulfate	1.32x10^-4	-2.0x10^-4

Table.2: Part B Analysis of Bleach

Trail #	Volume NaOCl Used	Mass of Bleach	Mass of Sodium Hypochlorite	% Mass
Trail #1	6.3ml	0.4622	9.73x10^-3	2.1%
Trail #2	6.2	0.4666	1.16x10^-2	2.49%
Trail #3	6.5	0.4664	9.80x10^-3	2.1%

	Average [ ]	Standard deviation
Bleach	2.78x10^-4	7.33x10^-2

Observations:

Part A: Standardization of sodium thiosulfate

Trail #	Initial Volume	End Volume
Trail #1	0.9ml	22.6
Trail #2	22.6ml	40.5
Trail #3	66.4ml	44.2

Part B: Analysis of Bleach

Trail #	Initial volume of NaOCl	End Volume of NaOCl	Mass of Bleach
Trail #1	21.0ml	27.3ml	0.4622
Trail #2	27.3ml	33.5ml	0.4666
Trail #3	33.5ml	40.0ml	0.4664

Calculations:
Part A: finding the mol of S2O3^2-
Example trail #1
KI03 [ ] = 0.01M x 0.015ml
= 0.00015

0.00015 x 3 mol I2/1 mol
I2 = 0.00045ml

0.00045 x 2 mol S2O3^2- / 1 mol I2
S2O3^2- = 0.0009 mol

Part A: finding concentration at the end of titration
Example #1
[S2O3^2-] = mol/v
0.0009/21.7
= 4.15x10^5-

Part A: Standard deviation
Example
E Sum exp value - E avg Value/ n
= [(4.15x10^-5]-[1.323x10^-4])/3 + [(5.03x10^-3]-[1.323x10^-4])/3 +
[(4.05x10^-3]-[1.323x10^-4])/3
= -2.04x10^-4

Part B: Finding grams of NaOCl
Example # 1
[S2O3^2-] x volume = mol S2O3^2
-4.15x10^-5 x 6.3 = 2.6x10^-4

mol S2O3^2 x 1 mol I2 / 2 mol mol S2O3^2 x 1 mol HoCl/ 1 mol I2 = mol HOCl = Mol NaOCL
2.6x10^-4 x 1 mol I2 / 2 mol mol S2O3^2 x 1 mol HoCl/ 1 mol I2 = 1.3 x 10^-4 mol HOCl = 1.3 x 10^-4Mol NaOCL

Mol NaOCl x Mw NaOCl = g NaOCL
1.3 x 10^-4 x 74.44 = 9.73x10^-3

% mass = g NaOCl/g Bleach
Example #1
% mass = 9.73x10^-3/ 0.4662
= 2.10x10^-2 X 100
=2.1%

Questions :

1. The results of the experiment show that we can use stoichiometry to find the %mass of bleach, for this experiment the average %mass was 2.3%. This experiment is reliable because of the results significantly similar when it came to not only %mass of the solution but when it also came to mol of HOCl and mol of NaOCl; also the ratio for the stoichiometry were small so chances of miscalculations are small, and with the addition of literature value to the calculations the results are reliable.

2. $HOCl_{(aq)} + 2I^{-1}{}_{(aq)} + H^{+1}{}_{(aq)} \rightarrow I_2^{+1} + Cl_{(aq)}^{-1}$

$HOCl_{(aq)} \rightarrow Cl_{(aq)}^{-1}$ = Oxidation reaction - is the reducing agent

$2I^{-1}{}_{(aq)} \rightarrow I_2^{+1}$ = Reduction reaction - is the oxidizing agent