Potentiometric Determination of Sodium Chloride in Persulfate Bleach
ECR-937

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**INTRODUCTION**

The sodium Chloride content of a potassium persulfate bleach is analyzed by direct titration with standardized silver nitrate solution. The potentiometric titration is done manually with a pH meter or on an automatic titrator. The results follow the indicated stoichiometry completely.

This method requires handling potentially hazardous chemicals. Consult the Material Safety Data Sheet for each chemical before use. MSDS’s are available from your chemical supplier.

**RELIABILITY**

Four standard mixes of fresh persulfate bleach were analyzed by two analysts in two laboratories. The mixes contained 5.00, 10.00, 15.00, and 20.00 g/L of sodium Chloride respectively, and 30.00 g/L of potassium persulfate. The 95 percent confidence limits for a single determination are ± 0.11 g/L sodium chloride.

**SPECIAL APPARATUS**

- PH Meter
- Reference Electrode, Double Junction, Orion No. 900200 or equivalent
- Orion Double Junction Reference Electrode, Catalog No. 90-02-00 or equivalent
- Indicator Electrode, Silver Billet, Beckman No. 39261 or equivalent

**Note:** Use pipets and volumetric glassware meeting the "Class A" definition by NIST (National Institute of Standards and Technology, formerly National Bureau of Standards).

**REAGENTS**

Use ACS Reagent Grade reagents unless specified otherwise.
- 7.0 N Sulfuric Acid, H₂SO₄
- 0.05 N Silver Nitrate, AgNO₃ (standardized to four decimal places)

**PROCEDURE**

**Sample Treatment**

1. Pipet, wipe before leveling, 5.00 mL of sample into a 250-mL beaker containing a magnetic stirring bar.
2. Add 10 mL of 7.0 N sulfuric acid from a tip-up pipet.
3. Add approximately 150 mL of distilled water to the beaker. Stir moderately on a magnetic stirrer.

**Titration**

1. Titrate the sample potentiometrically using standardized 0.05 N silver nitrate following Method ULM-0003-01, *Potentiometric Titrations for Photoprocessing Solutions*, or any subsequent revision.
2. Determine the end point using the concentric arcs technique, Method ULM-0003-01.

**CALCULATIONS**

\[
\text{NaCl, g/L} = \frac{(N \ AgNO_3)(mL \ AgNO_3)(\text{eq wt NaCl})(1000)}{(mL \ sample)(1000)}
= \frac{(N \ AgNO_3)(mL \ AgNO_3)(58.45)(1000)}{(50)(1000)}
= 11.69 \ (N \ AgNO_3)(mL \ AgNO_3)
\]