



Thermo

ELECTRON CORPORATION

Potentiometric Titration Application Notes

Applications Log # 430

Overview The concentration of bicarbonate is determined by the first derivative titration technique using hydrochloric acid as titrant. The concentration of phosphate however, is determined by adjusting the pH of the sample to 3.8 then adding excess zinc chloride (ZnCl₂). ZnCl₂ reacts with hydrogen phosphate to release hydrogen ions which is titrated back to pH 3.8 with sodium hydroxide using a preset endpoint technique. The Orion 960 determines the endpoints and calculates the concentration of bicarbonate and phosphate.

Industry

Species Measured Bicarbonate and phosphate

Sample Ophthalmic Solution

Sample Size 20 g

Typical Concentration

Technique # 6 First derivative and Preset endpoint

Electrode Ross Sure-Flow pH Electrode (8172BN)

Solutions Electrode filling solution (cat# 900011), Zinc chloride solution 2M, Hydrochloric acid 0.1M, and Sodium hydroxide 0.1M.

Sample Prep Accurately weigh out 20 g of sample into a 500 mL volumetric flask, then fill to mark with deionized water. Pipette 50 mL of the sample solution into a beaker, sample is then ready for first derivative analysis. When performing the first titration, make sure that the sample pH is about 10. After first analysis, adjust sample to pH 3.8. Add 10 mL of the zinc chloride solution and give a stirring time of 5 minutes. The sample is then ready for the phosphate analysis using the preset endpoint technique.

Statistics

of Trials 87 **Mean** 49%(w/w), 49.04m **%CV** 0.36. 1.73

Analysis Time 8.4 and 2.1 minute(s)

Comments Rinse the electrodes, stirrer, and dispenser probe thoroughly between measurements with deionized water.