

add 1 mL of 1 mol/L hydrochloric acid TS, shake, and add 1 drop of iron (III) chloride TS: a red-purple color develops.

(3) The solution obtained in (1) responds to the Qualitative Tests for calcium salt.

**Purity (1)** Clarity and color of solution—Dissolve 0.30 g of Calcium Para-aminosalicylate in 10 mL of dilute nitric acid: the solution is clear and colorless.

(2) Chloride—Dissolve 1.0 g of Calcium Para-aminosalicylate in 15 mL of dilute nitric acid, and add water to make 50 mL. Perform the test using this solution as the test solution. Prepare the control solution with 0.70 mL of 0.01 mol/L hydrochloric acid VS (not more than 0.025%).

(3) Heavy metals—Proceed with 1.0 g of Calcium Para-aminosalicylate according to method 3, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 20 ppm).

(4) Arsenic—Dissolve 0.40 g of Calcium Para-aminosalicylate in 20 mL of 0.1 mol/L hydrochloric acid TS by warming on a water bath, use this solution as the test solution, and perform the test using Apparatus B (not more than 5 ppm).

(5) *m*-Aminophenol—To 0.10 g of Calcium Para-aminosalicylate add 5 mL of 0.1 mol/L disodium dihydrogen ethylenediamine tetraacetate TS, previously cooled in ice-water, and dissolve by shaking vigorously. Add immediately 3 mL of ammonia-ammonium chloride buffer solution, pH 11.0, previously cooled in ice water, and shake. Add 2 mL of 4-amino-*N,N*-diethylaniline sulfate TS, shake, add 10.0 mL of cyclohexane and 4 mL of diluted potassium hexacyanoferrate (III) TS (1 in 10), and shake immediately for 20 seconds. Centrifuge this solution, wash the separated cyclohexane layer with two 5-mL portions of diluted ammonia TS (1 in 14), add 1 g of anhydrous sodium sulfate, shake, and allow to stand for 5 minutes: the clear cyclohexane layer has no more color than the following control solution.

Control solution: Dissolve 0.050 g of 3-aminophenol in water, and dilute with water to exactly 500 mL. Measure exactly 20 mL of this solution, and add water to make exactly 100 mL. Take 5.0 mL of this solution, add 3 mL of ammonia-ammonium chloride buffer solution, pH 11.0, previously cooled in ice-water, and treat this solution in the same manner as the sample.

**Assay (1)** Para-aminosalicylic acid—Weigh accurately about 0.4 g of Calcium Para-aminosalicylate, dissolve in 120 mL of water and 1.5 mL of dilute hydrochloric acid by warming on a water bath. After cooling, add water to make exactly 200 mL, and use this solution as the sample solution. Measure exactly 30 mL of the sample solution, transfer to an iodine flask, and add exactly 25 mL of 0.05 mol/L bromine VS and 20 mL of a solution of potassium bromide (1 in 4). Add immediately 14 mL of a mixture of acetic acid (100) and hydrochloric acid (5:2), stopper the flask immediately, and allow to stand for 10 minutes with occasional shaking. Add cautiously 6 mL of potassium iodide TS, and shake gently. After 5 minutes, titrate the produced iodine with 0.1 mol/L sodium thiosulfate VS (indicator: 1 mL of starch TS). Perform a blank determination.

Each mL of 0.05 mol/L bromine VS  
= 2.5523 mg of  $C_7H_7NO_3$

(2) Calcium—Measure exactly 40 mL of the sample solu-

tion obtained in (1), add 30 mL of water and 2 mL of ammonia-ammonium chloride buffer solution, pH 10.7, and titrate with 0.02 mol/L disodium dihydrogen ethylenediamine tetraacetate VS until the color of the solution changes from red to blue (indicator: 0.04 g of eriochrome black T-sodium chloride indicator).

Each mL of 0.02 mol/L disodium dihydrogen ethylenediamine tetraacetate VS  
= 0.8016 mg of Ca

**Containers and storage** Containers—Tight containers.  
Storage—Light-resistant.

## Calcium Para-aminosalicylate Granules

### Pas-calcium Granules

パラアミノサリチル酸カルシウム顆粒

Calcium Para-aminosalicylate Granules contain not less than 95% and not more than 105% of the labeled amount of calcium para-aminosalicylate ( $C_{14}H_{10}Ca_2N_2O_6 \cdot 7H_2O$ : 508.50).

**Method of preparation** Prepare as directed under Granules, with Calcium Para-aminosalicylate.

**Identification (1)** Powder Calcium Para-aminosalicylate Granules, weigh a portion of the powder, equivalent to 3 g of Calcium Para-aminosalicylate according to the labeled amount, add 15 mL of ammonium chloride TS and 15 mL of water, and heat on a water bath for 10 minutes: the gas evolved changes moistened red litmus paper to blue.

(2) Centrifuge the solution obtained in (1), and filter. To 10 mL of the filtrate add 1 mL of 1 mol/L hydrochloric acid TS, shake, and add 1 drop of iron (III) chloride TS: a red-purple color develops.

(3) The solution obtained in (2) responds to the Qualitative Tests for calcium.

**Purity (1)** Heavy metals—Powder Calcium Para-aminosalicylate Granules, weigh a portion of the powder, equivalent to 1.0 g of Calcium Para-aminosalicylate according to the labeled amount, and proceed as directed in the Purity (3) under Calcium Para-aminosalicylate.

(2) Arsenic—Powder Calcium Para-aminosalicylate Granules, weigh a portion of the powder, equivalent to 0.40 g of Calcium Para-aminosalicylate according to the labeled amount, and proceed as directed in the Purity (4) under Calcium Para-aminosalicylate.

(3) *m*-Aminophenol—Powder Calcium Para-aminosalicylate Granules, weigh a portion of the powder, equivalent to 0.10 g of Calcium Para-aminosalicylate according to the labeled amount, and proceed as directed in the Purity (5) under Calcium Para-aminosalicylate.

**Assay** Powder Calcium Para-aminosalicylate Granules, weigh accurately a portion of the powder, equivalent to about 0.4 g of calcium para-aminosalicylate ( $C_{14}H_{10}Ca_2N_2O_6 \cdot 7H_2O$ ), add 120 mL of water and 1.5 mL of dilute hydrochloric acid, and dissolve by heating on a

water bath. After cooling, add water to make exactly 200 mL, and filter. Pipet 30 mL of the filtrate, transfer to an iodine flask, and proceed as directed in the Assay (1) under Calcium Para-aminosalicylate.

Each mL of 0.05 mol/L bromine VS  
= 4.238 mg of  $C_{14}H_{10}Ca_2N_2O_6 \cdot 7H_2O$

**Containers and storage** Containers—Tight containers.  
Storage—Light-resistant.

## Calcium Polystyrene Sulfonate

ポリスチレンスルホン酸カルシウム

Calcium Polystyrene Sulfonate is a cation exchange resin prepared as the calcium form of the sulfonated styrene divinylbenzene copolymer. When dried, it contains not less than 7.0% and not more than 9.0% of calcium (Ca: 40.08).

Each g of Calcium Polystyrene Sulfonate, when dried, exchanges with 0.053 to 0.071 g of potassium (K: 39.10).

**Description** Calcium Polystyrene Sulfonate occurs as a pale yellowish white to light yellow powder. It is odorless and tasteless.

It is practically insoluble in water, in ethanol (95) and in diethyl ether.

**Identification** (1) Determine the infrared absorption spectrum of Calcium Polystyrene Sulfonate, previously dried, as directed in the potassium bromide disk method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

(2) Mix 0.5 g of Calcium Polystyrene Sulfonate with 10 mL of dilute hydrochloric acid, filter, and neutralize the filtrate with ammonia TS: the solution responds to the Qualitative Tests for calcium salt.

**Purity** (1) Ammonium—Place 1.0 g of Calcium Polystyrene Sulfonate in a flask, add 5 mL of sodium hydroxide TS, cover the flask with a watch glass having a moistened strip of red litmus paper on the underside, and boil for 15 minutes: the gas evolved does not change the red litmus paper to blue (not less than 5 ppm).

(2) Heavy metals—Proceed with 2.0 g of Calcium Polystyrene Sulfonate according to Method 2, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 10 ppm).

(3) Arsenic—Prepare the test solution with 1.0 g of Calcium Polystyrene Sulfonate according to Method 3, and perform the test using Apparatus B (not more than 2 ppm).

(4) Styrene—To 10.0 g of Calcium Polystyrene Sulfonate add 10 mL of acetone, shake for 30 minutes, centrifuge, and use the supernatant liquid as the sample solution. Separately, dissolve 0.010 g of styrene in acetone to make exactly 100 mL. Pipet 1 mL of this solution, dilute with acetone to make exactly 100 mL, and use this solution as the standard solution. Perform the test with 5  $\mu$ L each of the sample solution and the standard solution as directed under the Gas Chromatography according to the following

conditions. Determine the peak heights,  $H_T$  and  $H_S$ , of styrene in each solution:  $H_T$  is not larger than  $H_S$ .

**Operating conditions**—

Detector: A hydrogen flame-ionization detector.

Column: A stainless steel column about 3 mm in inside diameter and about 2 m in length, having polyethylene glycol 20 mol/L coated at the ratio of 15% on siliceous earth for gas chromatography (150 to 180  $\mu$ m in particle diameter).

Column temperature: A constant temperature of about 90°C.

Carrier gas: Nitrogen.

Flow rate: Adjust the flow rate so that the retention time of styrene is about 9 minutes.

Selection of column: Proceed with 5  $\mu$ L of the standard solution under the above operating conditions. Use a column showing a clear peak of styrene.

Detection sensitivity: Adjust the sensitivity so that the peak height of styrene obtained from 5  $\mu$ L of the standard solution is between 8 mm and 12 mm.

(5) Sodium—Pipet 2 mL of the 50-mL solution obtained in Assay (1), add 0.02 mol/L hydrochloric acid TS to make exactly 500 mL, and use this solution as the sample solution. Separately, weigh accurately 0.2542 g of sodium chloride, previously dried at 130°C for 2 hours, and dissolve in 0.02 mol/L hydrochloric acid TS to make exactly 1000 mL. Pipet a suitable volume of this solution, and dilute with 0.02 mol/L hydrochloric acid TS to make a solution containing 1 to 3  $\mu$ g of sodium (Na: 22.99) per mL, and use these solutions as the standard solutions. Perform the test with the sample solution and the standard solutions according to the Atomic Absorption Spectrophotometry under the following conditions, and determine the amount of sodium in the sample solution using the calibration curve obtained from the standard solutions: the amount of sodium is not more than 1%.

Gas: Combustible gas—Acetylene

Supporting gas—Air

Lamp: A sodium hollow-cathode lamp

Wavelength: 589.0 nm

**Loss on drying** Not more than 10.0% (1 g, in vacuum, 80°C, 5 hours).

**Microparticles** (i) Apparatus: Use an apparatus as shown in the illustration.

Actual volume to the mark of 20 cm at which the sedimentation tube is inserted: 550 mL

Single suction volume: 10 mL

- A: Mark of pipet bulb  
B: Pipet bulb for suction  
C: Two-way stopcock  
D: Vent-hole  
E: Suction part of pipet  
F: Mark of 20 cm  
G: Base line of 0 cm  
H: Outlet of pipet  
I: Capillary tube of pipet  
J: Sedimentation tube

