

Polyvinyl Acetate

homopolymer of acetic acid ethenyl ester

Definition Polyvinyl Acetate is a polymer of vinyl acetate.

Description Polyvinyl Acetate occurs as colorless to light yellow granules or glassy lumps.

Identification Dissolve about 1 g of Polyvinyl Acetate in 5 ml of toluene, and proceed as directed under the Thin Film Method in Infrared Spectrophotometry. The solution exhibits absorbances at about 1,725 cm⁻¹, 1,230 cm⁻¹, 1,015 cm⁻¹, 937 cm⁻¹, and 785 cm⁻¹.

Purity (1) Free acids Not more than 0.20% as CH₃COOH.

Weigh accurately about 2 g of Polyvinyl Acetate, add 50 ml of methanol, and dissolve by shaking occasionally. Add 10 ml of water, and titrate with 0.1 mol/l sodium hydroxide (indicator: 4-5 drops of phenolphthalein TS). Perform a blank test, and make any necessary correction. Calculate the amount of free acids as acetic acid (CH₃COOH) by the formula

Amount of free acids =

$$\frac{\text{Volume (ml) of 0.1 mol / l sodium hydroxide consumed} \times 60}{\text{Weight (g) of the sample} \times 10 \times 1,000} \times 100(\%)$$

(2) Heavy metals Not more than 10 µg/g as Pb (2.0 g, Method 2, Control solution Lead Standard Solution 2.0 ml).

(3) Arsenic Not more than 4.0 µg/g as As₂O₃ (0.50 g, Method 3, Apparatus B).

(4) Residual monomer Not more than 5 µg/g

Test Solution Fold a portion of Polyvinyl Acetate in a powder paper and then a wrap film, and smash into fine pieces with wooden hammer. Weigh accurately about 2.5 g, dissolve in toluene to make 25 ml.

Standard Solution Measure exactly 50 mg of vinyl acetate, add toluene to make exactly 50 ml, and express the solution as solution A. Measure 1.0 ml, 0.3 ml, 0.1 ml, 0.03 ml, and 0.01 ml of solution A, add toluene to each to make exactly 100 ml.

Measure 1 µl each of the test solution and the standard solutions, and perform Gas Chromatography under the operating conditions given below. Measure the peak height or peak area of each standard solution and prepare a calibration curve. Measure the peak height or peak area of the test solution and determine the content using the

calibration curve.

Operating Conditions

Detector: Hydrogen flame ionization detector.

Column: Thin silicate glass tube 0.32 mm in internal diameter and 30 cm in length, coated with dimethylpolysiloxane for gas chromatography at a thickness of 5 μm .

Column temperature: Retain at 100 for 8 minutes, and raise the temperature at a rate of 20 per minute. After the temperature reaches to 250, retain for 5 minutes.

Temperature at the inject port: 150.

Injection method Split method(8:1).

Carrier gas and flow rate: Use helium. Control the flow rate so that the peak of vinyl acetate appears after around 7 minutes.

Loss on Drying Not more than 1.0% (not higher than 0.7kPa, 80, 3 hours).

Residue on Ignition Not more than 0.05% (5 g).