Molecular formula. Na\textsubscript{2}SO\textsubscript{4},10H\textsubscript{2}O

Relative molecular mass. 322.2

Chemical name. Disodium sulfate decahydrate; sulfuric acid disodium salt, decahydrate; CAS Reg. No. 7727-73-3 (decahydrate).

Other name. Glauber’s salt.

Description. Colourless crystals or a white powder; odourless.

Solubility. Freely soluble in water; practically insoluble in ethanol (~750 g/l) TS.

Category. Laxative.

Storage. Sodium sulfate should be kept in a well-closed container.

Additional information. Sodium sulfate partially dissolves in its own water of crystallization at about 33°C.

Requirements

Definition. Sodium sulfate contains not less than 99.0% and not more than 100.5% of Na\textsubscript{2}SO\textsubscript{4}, calculated with reference to the dried substance.

Identity tests

A. When tested for sodium as described under 2.1 General identification tests, yields the characteristic reactions.

B. A 0.05 g/mL solution yields reaction A described under 2.1 General identification tests as characteristic of sulfates.

Heavy metals. Use 1.0 g for the preparation of the test solution as described under 2.2.3 Limit test for heavy metals, Procedure 1; determine the heavy metals content according to Method A; not more than 20 μg/g.

Ammonium salts. Transfer 1 g to a test-tube, add about 0.3 g of potassium hydroxide R and heat the mixture; a moistened red litmus paper R placed in the evolved vapours does not turn blue.

Arsenic. Use a solution of 5 g in 35 mL of water and proceed as described under 2.2.5 Limit test for arsenic; the arsenic content is not more than 2 μg/g.

Calcium. To two separate comparison tubes transfer 0.2 mL of ethanolic calcium standard (100 (μg/mL Ca) TS, add 1.5 mL of ammonium oxalate (25 g/l) TS, allow to stand for 1 minute, and then add 1 mL of acetic acid (~120 g/l) TS. To one tube add a solution of the substance to be examined containing 0.5 g in 15 mL of water, and to the second tube add 10 mL of calcium standard (10 μg/mL Ca) TS and 5 mL of water. Observe any opalescence produced after 15 minutes; the opalescence in the first tube is not more intense than that in the second tube (200 μg/g).

Chlorides. Dissolve 1.25 g in a mixture of 2 mL of nitric acid (~130 g/l) TS and 30 mL of water and proceed as described under 2.2.1 Limit test for chlorides; the chloride content is not more than 0.2 mg/g.

Iron. Using 1.0 g prepare a solution in 40 mL of water and proceed as described under 2.2.4 Limit test for iron; not more than 40 μg/g.

Magnesium. Dissolve 0.5 g in 10 mL of water, add 1 mL of glycerol R, 0.15 mL of titan yellow TS, 0.2 mL of ammonium oxalate (50 g/l) TS, and 5 mL of sodium hydroxide (~80 g/l) TS, and shake; any pink colour produced is not more intense than that of a similarly treated mixture of 5 mL of magnesium standard (10 μg/mL Mg) TS and 5 mL of water.

Clarity and colour of solution. A solution of 0.50 g in 10 mL of carbon-dioxide-free water R is clear and colourless.

Reducing substances. Dissolve 0.5 g in 5 mL of water, add 1 mL of sulfuric acid (~100 g/l) TS and 0.20 mL of potassium permanganate (0.002 mol/l) VS. Allow to stand for 15 minutes; no discoloration is observed.

Loss on drying. Dry at 30 °C for 1 hour and then to constant weight at 130°C; it loses not less than 0.52 g/g and not more than 0.57 g/g.

Acidity or alkalinity. Dissolve 0.5 g in 10 mL of carbon-dioxide-free water R and add 0.1 mL of bromothymol blue/ethanol TS; not more than 0.5 mL of carbonate-free sodium hydroxide (0.01 mol/l) VS or 0.5 mL of hydrochloric acid (0.01 mol/l) VS is required to obtain the midpoint of the indicator (green).

Assay. Dissolve about 0.25 g, accurately weighed, in 250 mL of water, add 10 mL of hydrochloric acid (~70 g/l) TS, heat to
boiling and add a sufficient quantity of barium chloride (50 g/l) TS. Heat on a water-bath for 30 minutes, stirring occasionally. Collect the precipitate, wash, dry and ignite at 600 °C. Each g of residue is equivalent to 0.608 g of Na$_2$SO$_4$. 