

Szechrome Reagents

For Nitrate and Nitrite Analysis

Introduction:

The Szechrome reagents are nontoxic reagents specific for nitrate or nitrite ions in sea or lake water, soil, plant, and meat extracts, biological fluids, and fertilizers. These sensitive reagents react rapidly to produce stable colors suitable for precise quantitative determinations or rapid estimations in routine field work. The Szechrome reagents offer several advantages over other methods for nitrate/ nitrite testing:

- Stable
- Not toxic
- Stable color develops rapidly and is not temperature sensitive

Szechrome NAS and NB reagents produce color reactions which are specific and proportional to the nitrate content of the sample tested. Szechrome NIT is similarly specific for nitrite ions.

Szechrome NAS:

Preparation of Working Reagent Solutions: Mix equal volumes of analytical grade concentrated phosphoric acid (85-86%) and concentrated sulfuric acid (95-97%). **Let stand one week.** **NOTE:** Analytical grade sulfuric acid and phosphoric acid always contain a small amount of NO₃. Although the amount of NO₃ impurity is generally less than the admitted maximum, these acids cannot be used for the preparation of reagent solutions immediately after they are mixed together. Although it is impossible to obtain nitrate-free acids by the usual purification procedures, it has been found that the nitrate content diminishes if the mixtures are allowed to stand in closed flasks for several days. It is recommended to prepare the acid mixtures beforehand and to let them stand for at least a week before using them as solvents. Following these instructions colorless or slightly colored solutions will be obtained.

Sensitivity range is from 1 to 20mg nitrate/liter. To prepare stable reagent solution-dissolve 1 vial (5g) NAS in a liter of a mixture of equal volumes of nitrate-free concentrated H₃PO₄ and concentrated H₂SO₄ (see above). Close the flask tightly and shake until solubilized. The reagent is ready for use when the liberated gas is absorbed and the liquid clears.

Procedures:

Determination Procedure: 0.5ml aqueous nitrate sample is gently mixed with 5ml reagent solution. The violet color intensity is read at 570nm in a 1cm cell after 10-60 minutes or compared with color standards. Concentration range 2-20ppm NO₃. For samples containing up to 200ppm NO₃, use 0.05ml of test solution.

Detection Procedure: 1 drop nitrate sample is mixed with 15-20 drops reagent. Development of a violet color in a few minutes indicates the presence of NO₃ at a level of 0.1µg or greater.

Various ions have little test influence. Estimations are not disturbed by considerable amounts of oxidants such as persulfate, chromate, and chlorine or reducing agents such as sulfite and hydroxylamine. Precise quantitative determinations can be made in the presence of up to 1000ppm of chloride and large amounts of nitrite and solvents such as ethyl acetate or chloroform.

Uses:

Suitable for the determination of the nitrate content of natural waters, industrial waste effluents, soil, plant and meat extracts, tinned goods, biological fluids (sputum, urine), chemicals, fertilizers, and drugs. NAS has been used in place of the phenoldisulfonic acid, brucine, and chromotropic acid methods used previously.

Szechrome NIT:

Preparation of Working Reagent Solution: Use a 100ml volumetric flask. Add 10g of reagent powder, 20-30ml of water, and 10ml of HCL. Heat the mixture gently until it is completely solubilized (about 50°C). Makes up to 100ml with ethanol. A clear, colorless solution is obtained which is stable for several weeks if kept in well closed flasks. Slightly violet-red colored solutions can also be used without affecting the results.

Sensitivity range from 0.03 to 2 ppm.

Procedures:

Colorimetric Determination of Nitrite Ions: 5-10ml aqueous nitrite sample is mixed with 0.5ml NIT reagents solution. The intensity of the developed bluish-red color is read at 545nm, in 0.5-4cm cells after 5-120 minutes. Range 0.03-2ppm NO₂. As little as 0.006ppm NO₂ (0.002ppm N) can be estimated visually by comparison with color standards by use of Nessler tubes.

Volumetric Determination of Nitrites: Add 1ml of NIT solution to a mixture of 10ml 0.05M standard sulfanilic solution, 10ml sodium nitrite 40% w/v sol., 10ml 6M hydrochloric acid, and 20ml water and heat to about 50°C. Slowly add the nitrite sample solution from a burette. An

intense bluish-red color develops on addition of the first drops of the nitrite sample, and the intensity of the color remains unchanged by further nitrite addition, until it fades and turns yellow when a small excess of nitrite is added, thus indicating the end of the titration. 10ml 0.05M sulfanilic acid corresponds to 3.45mg NO₂. Larger amounts of nitrites can be determined with the same procedure by multiplication of the volumes of the reagents and the amount of the NIT indicator.

Volumetric Determination of Primary Arylamines and Their Precursors: Transfer into a 100ml flask 0.05meq of an easily diazotizable primary arylamine, add 10ml 6M hydrochloric acid, 10ml sodium nitrate 40% w/v sol., 30ml water, and heat to 50°C to dissolve. Add 1ml NIT solution and proceed as given in nitrite determination, using 0.5M sodium nitrite as totrant. Each ml sodium nitrite standard solution corresponds to 0.05meq arylamine. Larger amounts of samples can also be determined, as specified for the nitrite determination.

Uses:

NIT reagents is suitable for rapid determination of nitrites in waters, food, meat, plant and soil extracts, in biological fluids (saliva, blood, urine), and for the determination of nitrogen oxides in air.

Ordering Information:

Cat. #	Description	Size
08762	Szechrome NAS	5g
08764	Szechrome NIT	5g

References:

1. Microb. Ecol., **6**, 95 (1980)
2. Talanta, **19**, 1429 (1972)
3. Isr. Chem. Soc. 43rd Annual Meeting. Proceedings, p.107 (1975)
4. Isr. Chem. Soc. 43rd Annual Meeting. Proceedings, p.106 (1975)

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