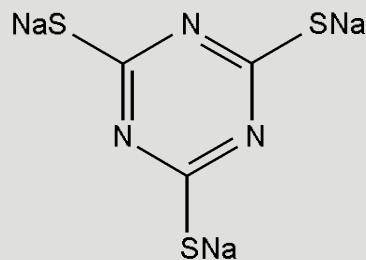


TMT 15[®] - Determination of the TMT concentration in aqueous solutions and effluents

Analytical procedure / Info 5 E



1. Principle

TMT 15[®] is used for precipitating heavy metals out of effluent in the form of virtually insoluble metal-TMT compounds. Since surplus precipitant is used in the process, it is desirable in certain cases to have a method for determining the concentration of free TMT 15[®], which is not in combination with heavy metals.

TMT is a 15% aqueous solution of the sodium salt of trimercapto-s-triazine:

Empirical formula: $C_3N_3S_3Na_3$

Molar mass: 243,22 g/Mole

Density of TMT 15[®]: approx. 1,12 g/cm³

Content of $C_3N_3S_3Na_3$: min. 15 % by weight = 168 g/l

Even traces of TMT 15[®], that is to say the active constituent $C_3N_3S_3Na_3$, can be determined not only in pure aqueous solutions but also in industrial effluent containing salts or flue gas scrubbing water. This is best done by UV-spectroscopy. The $C_3N_3S_3Na_3$ must be present in the form of an alkaline solution (1 mole/l sodium hydroxide).

Concentrations as low as approx. 2 mg $C_3N_3S_3Na_3$ per litre of effluent are still detectable. At a concentration of approx. 168 g $C_3N_3S_3Na_3$ per litre of TMT 15[®], the concentration of free TMT 15[®] per litre of effluent still has a measurable threshold value of 0.012 ml.

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2.2 Analysis of the effluent sample

The same procedure applies here as described in 2.1. 50 ml neutral effluent are mixed with sodium hydroxide solution (2 moles/l) in a volumetric flask, after which the mixture is topped up to 100 ml. This sample is then measured in a 1 cm quartz cuvette against the control solution at 285 nm. From the extinction value obtained, the corresponding concentration of $C_3N_3S_3Na_3$ can be read off at the calibration curve. Since the original effluent sample was diluted to twice its starting volume with sodium hydroxide solution, the result must be multiplied by a factor of 2 in order to obtain the original concentration of $C_3N_3S_3Na_3$.

3. Notes

If the effluent sample is of high salinity, this can lower its extinction value and lead to erroneous measurements. In order to eliminate this side-effect of the matrix, it is important to make up the standard and control solutions using water which has a salinity corresponding to that of the original effluent sample. This water must also be neutral (approx. pH7) and contain no heavy metals or TMT 15[®].

The samples to be measured must be clear. Solids must be filtered off beforehand. If the flue gas scrub water has a high calcium content, this can lead to the precipitation of calcium hydroxide as the sample is made alkaline. Calcium hydroxide does not adsorb any TMT 15[®], so that even samples of this sort can be conditioned by simple filtration.

The concentration of $C_3N_3S_3Na_3$ in the TMT 15[®] can be determined by potentiometric titration against sulphuric acid. This set of analysis instructions for TMT 15[®] is available to all interested parties.

Hazard warning

TMT 15[®] is classified "Irritant". For information on labelling, transport classifications, first aid and toxicology, please see the current safety data sheet.

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