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THE SPECTROPHOTOMETRIC DETERMINATION OF THIOCYANATE WITH N,N,N',N'-TETRAETHYLBENZIDINE

A new spectrophotometric indirect method for thiocyanate determination was proposed. The method is based on thiocyanate oxidation by the known excess of hypochlorite and following measurement of absorbance of the oxidation product by an excess hypochlorite of N,N,N',N'-tetraethylbenzidine at 475 nm. When determining optimal conditions of the reaction and verification of its suitability for analytical purposes we investigated the relationship between N,N,N',N'-tetraethylbenzidine oxidation products and the molar ratio $n(ClO^-)/n(CNS^-)$ in the initial solution of the reagent, the exposure time of the reaction mixture, the optimum reagent concentrations and acidity of the medium. The detection limit (blank +3σ) for thiocyanate is 0.12 mg·L^{-1} where σ is the standard deviation of blank estimation. The linearity range of the calibration graph was over 0.4–4.0 mg·L^{-1} of thiocyanate ($s_r \leq 0.04$, $n = 7$). The metrological characteristics of the procedure were checked by on the working samples. Results of testing methods satisfactory evidence of its accuracy and convergence. The effect of foreign ions in thiocyanate determination of 2.0·10^{-5} mol·L^{-1} has been studied. Established that components such as natural water dyhydrofosfat-, dyhydropirofosfat-, nitrate and Zn^{2+}, Cd^{2+}, Ni^{2+}, Cu^{2+}-ions do not interfere with the determination thiocyanate. Determination of NCS^- prevent fluoryd- and iodide-ions in comparable amounts. The reagents are accessible and resistant over time. The proposed procedure is simple and suitable for thiocyanate determination in various objects.

Keywords: thiocyanate, N,N-diethylaniline, N,N,N',N'-tetraetilbenzidine, hypochlorite, spectrophotometry.