Abstract

This rigorosis thesis is divided into two parts, which are closely related. The first part deals with optimization of conditions for the determination of dissolved silicates using sequential injection analysis adjusted in accordance with applicable ISO standards for the FIA method, the second, main part of work deals with the development of the automated SIA system for the parallel determination of selected anions in the commercial SIA system. CSN EN ISO 16 264 describing FIA metodology suitable for determination of dissolved silicates with spectrophotometric detection was based on the reaction of a sample containing dissolved silicates with the reagent (acid solution of heptamolybdate), which reacts with the silicates and phosphates to form acid molybdato - silicate and molybdatophosphate, which is then decomposed by oxalic acid. Molybdatosilicate acid is reduced by acidic solution of stannous chloride to the resulting product of the reaction - molybdenum blue – that was measured at 710nm. In the experimental work transfer of the FIA method to the determination in the sequential injection system in compliance with the calibration ranges listed in the ISO standard was carried out. Calibration curves showed linearity in the range c = 0.2 to 2.0 mg /l and c = 2.0 to 20.0 mg /l with a correlation coefficients R^2 = 0.9982 and R^2 = 0.9968, respectively.

In development of the automated SIA system for the parallel determination of selected ions knowledge gained in the previous diploma work (topic: SIA determination of nitrite, nitrate, chloride according to the applicable ISO standards) was used together with the experience with determination of dissolved silicate processed at this rigorosis thesis. The experiment result was a calibration program for the parallel determination of selected ions in the commercial SIA system with practical tests of parallel determination of selected ions, including measurement of the selected range calibrations and measurement repeatability. The achieved results confirm the possibility of using the SIA method for the determination of dissolved silicates in the routine analysis with compliance to the applicable requirements of ISO norms. Performance of the program for parallel determination of selected ions (nitrites, nitrates, chlorides and silicates) using sequential injection analysis has been carried out using the model composite samples. Practical application of the developed method can be expected in the automated measurements with a relatively high sample throughput.