We have developed methods of detecting carbon, oxygen, nitrogen and hydrogen in titanium sponge and titanium powders of various chemical and fraction composition, have them certified and introduced into Ukrainian State Standards, international standards and other regulatory documents. An algorithm of performing these methods provides for application of modern analytic equipment combined with classic analysis stages and sample preparation.

The reliable prompt detection of oxygen and nitrogen in titanium products considerably depends on conditions of sample preparation. High adsorption property of metal surface, particularly at analysis of finely dispersed products makes the analytical task more complicated.

The principle of carbon detection method is intense heating of the sample in oxygen flow at inductive furnace active zone. Content of analytic form, i.e. of carbon dioxide is measured with IR detector.

We have discovered optimal parameters of hydrogen detection in titanium sponge, finely dispersed metal titanium, its hydrides and semihydrides with an application of gas chromatography method. We consider it prospective to apply the method of induction heating in inert gas flow that enables one to provide high sensibility of detection with proper metrology characteristics of the analysis.

We have developed and fabricated standard samples of titanium composition with certified oxygen, nitrogen and carbon content, and have them approved.

**EFFECT OF MATRIX AT THE ATOMIC EMISSION SPECTRAL ANALYSIS OF IV GROUP OF PERIODIC SYSTEM ELEMENTS OXIDES**

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The silicon (SiO₂), titanium (TiO₂) and zirconium (ZrO₂) dioxides, including modified of different reactants, find broad application in analytical practice. The hydrated SiO₂ often use as silica gel, aerosile and their modified analogs, TiO₂ with crystalline structure of anataze or rutyle used as dye marker. At the TiO₂ synthesis for acceleration of crystallization and modifying surface process utilized some of oxides: P₂O₅, SiO₂, Sb₂O₃, ZnO, MgO, Al₂O₃, ZrO₂ on (> n 10⁻¹ mass. %) concentration. As known a refractory ZrO₂ that used on ceramic industry have gains indispensable chemical inertness at oxidizing atmosphere with 1500-2000°C temperatures after modification of its cubic structure by the additions of oxides CaO, MgO, Y₂O₃.

An accurate and simple method of atomic emission spectral (AES) determination of 17 elements in industrial and nature waters with low contents of salts after its preconcentration on amorphous SiO₂ are proposed. Matrix effect that takes place and are stipulated by increasing weight of analytes and size of SiO₂ particles was eliminate by dilution of concentrates with high purity graphite. In result the exhaust-and-forced method of an emission spectral analysis of structures on the basis of SiO₂ and also some of natural and high purity industrial waters was offered at determination 17 trace elements. The method detection limit for marked waters are 2-10 ppm.

To elimination of crystalline structure effect of pigmental titanium dioxide (TiO₂) on the calibration curves position have been used a method of full burning parsed is model in a high-temperature electric arc at their preliminary dilution (1:5) by graphite. Detection limits of impurity – 1 10⁻⁴-1 10⁻³ mass. %.

The methods of AES determination some of impurities (n 10⁻³ up to 10⁻¹ mass.%) and also stabilizing components CaO and MgO in high purity ZrO₂ are proposed.
Pursuant to structure of materials to be analyzed and nature of determining elements have been used the method of fraction evaporation of impurities from craters of coal electric arc or universal full burning method. The optimum conditions of definition of units - impurity of a different volatility about sensitivity conforming are reached. The relative standard deviation (S_r) in all cases does not exceed 0,12-0,15.

SONOLUMINESCENCE AS A NEW ANALYTICAL METHOD

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Key words: sonoluminescence spectrophotometric, sodium chloride, spectra, ionization energy, temperature boiling of metals.

During effecting of ultrasonic (US), a weak luminescence of liquid named, in present time, as sonoluminescence is watched. Sonoluminescence is evoked by effective concentrating of acoustic field energy inside gasfulled cavitation bubbles that leads to formation of excited molecules. It was found that sonoluminescence is watched only when cavitation in liquid is presented. Sonoluminescence is used in sound-chemistry during studying of mechanism and energetics of sound-chemical reactions.

We have established that magnitude and position of sonoluminescence spectra alkaline and alkaline-earth elements depend on the US parameters: frequency and intensity, type and concentration of dissolved gases and approximately correspond to the spectra used in the spectral methods of analysis: emission and atomic-absorption spectrometry.

In taking off spectra of solutions of NaCl in bidistillated water saturated with air, Ar, He, it is shown that altitude of spectra decreasing with transfer from air to He. When NaCl concentration increases the spectrum altitude grows proportionally to increasing of concentration. When US frequency changes the spectrum changes insignificantly. When US intensity increases the growth of sonoluminescence intensity, attainment of its maximum value and next falling were watched. The maximum value of sonoluminescence intensity was in US intensity interval 1-10 W/cm², threath a character of dependence of sonoluminescence intensity from US intensity depended from dissolution gas nature. When increasing of the width of monochromator spectral split was more then 0.3 nm, mutual duplet recovering and appearance of one spectral line has been watched, threath the spectrum altitude was somewhat increased.

According to modern idea, sonoluminiscence spectra of alkali and alkaline-earth elements are forming after heating of a cavitation bubble interface with liquid in evolving of energy appearing in the moment of its collapse.

Studying of the sonoluminescence spectra of solutions of alkaline metal chloride has shown absence of OH radical band (310-340 nm), which is usually presented in sonoluminescence spectrum of water.

Thus, the employment of sonoluminescence spectra as analytical signals of quality and quantity content of substances is possible. White analyzing solutions of NaCl, of vacuum-boiling extraction and solid salt elements content determination is possible if the content of Ca and Mg is > 10 g/dm³ (tabl. 2). It should be noted that determination of Na in the solutions of common salt and NaCl, the employment of the offered method provides the better metrological characteristics in comparison with the atom-absorption spectrometry method in the employment of which, the dilution of a sample with 1000 and more times is needed because of high sensibility.