Journal of Analytical Chemistry, Vol. 60, No. 5, 2005, pp. 491–495. Translated from Zhurnal Analiticheskoi Khimii, Vol. 60, No. 5, 2005, pp. 555–559.

CHRONICLE

II All-Russia Symposium on Test Methods of Chemical Analysis

II All-Russia Symposium "Test Methods of Chemical Analysis" was held July 21–25, 2004, in the Landysh hotel near Saratov (Photo 1). The organizers of the symposium were the Russian Academy of Sciences, the Scientific Council of the Russian Academy of Sciences on Analytical Chemistry, the Chernyshevsky State University (Saratov), and the Environmental Engineering Center.

The collection of abstracts includes the abstracts of 78 presentations delivered by 174 authors from scientific centers of the Russian Federation and Ukraine: Moscow State University; the Kurnakov Institute of General and Inorganic Chemistry of the Russian Academy of Sciences; the Bach Institute of Biochemistry of the Russian Academy of Sciences; the Vernadsky Institute of Geochemistry and Analytical Chemistry of the Russian Academy of Sciences; FGUP IREA; NPF Vinar; the Gubkin State Academy of Oil and Gas; the All-Russia Institute of Light Alloys; Lomonosov State Academy of Fine Chemical Technology; St. Petersburg State University; the Krismas+ company; Kazan State University; Kazan Technological University; Kazan Medical University; Vladimir, Kuban, Omsk, Nizhni Novgorod, and Tomsk State Universities; the Urals Research Institute of Metrology; the Ivanovo Institute of the Ministry of Emergencies of Russia; Voronezh State Technological Academy, the Institute of the Ministry of Internal Affairs of Russia; Seversk Polytechnical Institute; Tomsk Polytechnical Institute; Chernyshevsky State University (Saratov); Saratov State Technical University; Saratov Agricultural University; Kiev, Dnepropetrovsk, and Kharkov National Universities; Odessa National Academy of Food Technologies; and the Physicochemical Institute of the National Academy of Sciences of Ukraine (Photo 2).

The organizing committee received financial support from the Presidium of the Russian Academy of Sciences.

The main areas of the scientific program of the symposium were chemical and enzymatic test methods, immunoassay tests, instruments for testing, and the metrology of test devices. These areas were presented and discussed in oral lectures and posters.

The symposium was opened by Yu.A. Zolotov. He said, "It has been noted many times that analytical chemistry is 'omnivorous' in the sense (good sense!) that it can use various approaches, methods, and devices to solve its problems. Thus, along with com-

Photo 1. View of the hotel.

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Photo 2. Group of the symposium's participants.

plex multifunctional instruments, which are characterized by impressive capabilities and equally impressive cost, portable analyzers for a single compound and even simplest 'noniron' devices are successfully used. The latter primarily include test devices for rapid out-of-laboratory analysis.

Test methods of chemical analysis must not necessarily ensure a high sensitivity and a high accuracy, to say nothing of some special selectivity. These methods have their own advantages: simplicity of use, possibility of rapid analysis including in-the-field analysis, low cost, and no need for qualified personnel. Therefore, test systems (i.e., devices plus instructions), especially those that are chemical in nature, have been and will be developed, have been and will be used. In the development of test devices, the Russian chemical analytical community has an advantage over the corresponding communities of some other countries because, in our country, much attention has always been given to the fine chemistry of interaction, e.g., of metal ions with organic reagents, and many analytical regents have been proposed in our country. The interest in test methods is also stimulated by the increasing mass of analyses and the appearance of new fields that require rapid estimation of the chemical composition of a material.

The first oral lecture, "Test Methods in Studies at the Department of Analytical Chemistry, Chernyshevsky State University," was delivered by R.K. Chernova. The main lines of the studies on test methods at the department were listed: the use of natural and industrial materials as unconventional matrices, the immobilization of specific "modified" reagents, the development of versatile techniques for the immobilization of organic reagents of different classes on solid matrices like xerogels, filter paper, and Langmuir–Blodgett films.

E.I. Morasanova (Moscow State University) delivered the lecture "Chemical Test Determination Methods Based on the Modification of Silicic Acid Xerogels" on behalf of a group of authors from the Department of Analytical Chemistry, Moscow State University. The features of different chromogenic reaction in silicic acid xerogels and micellar solutions involving surfactants of different types were studied. The methodology of the development of test devices of three types (indicator powders, indicator tubes, and "ready" solutions) were formulated as a result of the systematic studies of the mechanisms of analytical reactions, their thermodynamics, and kinetics. The advantages of different test devices were compared, and the wide range of the practical use of these devices in medical, environmental, and scientific centers was demonstrated.

V.M. Ostrovskaya (Moscow), in the lecture "Synthesis of Analytical Reagents on Cellulose Matrices," outlined a new technology for the preparation of reactive indicator papers. It consists in covalent bonding through functional groups of the analytical reagent on cellulose matrices. The role of the donor–acceptor

interaction, the spatial and coordination compatibility, and the conjugation chain length was demonstrated. Test methods that allow the rapid analysis of aqueous, gaseous, and solid samples were developed on the basis of 80 analytical reagents.

In the lecture "On the Role of Surfactants in Preparing Test Systems on the Basis of Silicic Acid Xerogels," L.M. Kozlova, on behalf of a group of authors from Saratov, outlined a methodology of the melange-gel technique for preparing xerogels modified with organic reagents of different groups and demonstrated the ways of controlling the process by varying acidity, the concentrations of reagents, the ionic strength of electrolytes, and the type and branching of the surfactant. The performance characteristics of the new test systems were compared with the characteristics of known test systems for heavy metal ions, and the advantage of the new test systems was demonstrated. Examples of their use for the determination of heavy metals in environmental samples were given.

The introduction of procedures for test control requires the information on their metrological characteristics. In this regard, the lecture "Development of the Metrological Fundamentals of Visual Test Analysis," delivered by E.A. Reshetnyak (Kharkov) on behalf of a group of authors was of interest. Possible ways of improving the metrological investigation of test methods were discussed. A numerical technique for testing the distribution hypotheses using the complex of Kolmogorov–Smirnov criteria was proposed, and techniques for controlling the necessary size of the sample of results in the course of the experiment were discussed. The new method can be applied to test systems based on indicator papers, gelatin films, foamed polyurethane, etc.

One of the areas of investigation presented at the symposium was the development of immunoassay tests. In this regard, the lecture "Immunochromatographic Tests for the Rapid Determination of Biologically Active Compounds," delivered by N.A. Byzova (Moscow) on behalf of a group of authors, deserved attention. Results of the development of test systems for the rapid detection of low- and high-molecular antigens in biological materials were described in detail. The systems were based on the use of colloidal gold and antibody–colloid conjugates on the basis of microorganisms for the determination of narcotics in biological materials. A portable instrument for immunochromatographic analysis was developed and tested; the instrument is suitable for both laboratory and out-of-laboratory experiments.

The lecture of S.A. Eremin (Moscow State University), "Rapid Determination of the Antibiotic Chloramphenicol by Fluorescence Polarization Immunoassay," was devoted to the development of a procedure of fluorescence polarization immunoassay (FPIA). The procedure consists in the addition of solutions of antibodies and a fluoresceine-tagged antigen (tracer) and the measurement of the change in the fluorescence polarization of the reaction mixture. Polyclonal anti-chloramphenicol antibodies were obtained by the immunization of sheep with conjugates of chloramphenicol derivatives with the carrier protein (KLH), and the tracers (chloramphenicol–hemisuccinate–ethylenediamine–fluoresceine isothiocyanate and chloramphenicol–fluoresceine isothiocyanate) were synthesized. These two tracers differ from each other in the length of the chemical arm between the chloramphenicol residue and fluoresceine. The procedure was adapted for the rapid determination of chloramphenicol in water, milk, and other foodstuffs.

G.R. Safina (Kazan) delivered the lecture "Amperometric Immunosensors for the Rapid Diagnostics of Some Diseases." Techniques were developed for testing biological fluids for the concentration of bacterial antigens using amperometric immunoenzyme sensors of different types involving cholinesterase and antibodies. It was demonstrated that the new sensors are promising in medicine for the rapid diagnostics of some infectious diseases.

The lecture by E.G. Kulapina (Saratov), "Rapid Determination of Some Organic Compounds Using Potentiometric Sensors," was devoted to the use of potentiometry with membrane selective electrodes for the determination of physiologically active amines, antibiotics of the penicillin series, aminoglycosides, and surfactants of different types. More than 20 techniques were proposed for the determination of the above compounds in environmental materials and pharmaceutical forms.

In the lecture "Test Systems for Organic Compounds Containing a Primary Amino Group," I.V. Myznikova (Saratov) reported the results of the development of new test systems as indicator papers based on the immobilization of diazonium salts in the presence of sodium dodecyl sulfate. The concentration of primary aromatic amines can be determined not only visually, but also using the scanner technique. Results of the determination of 16 primary aromatic amines using the new test systems in environmental materials at a level of the maximum permissible concentration were presented, and the prospects for decreasing the lower determination limit of amines using diazonium salts with electron-donating substituents were demonstrated.

Great interest was aroused by the lecture of the director of NPO Krismas+, A.G. Murav'ev, "On the Use of Test Methods in Packs for Environmental Chemical Control." Different portable packs for the rapid analysis of water, air, and soil extracts were demonstrated. The audience was provided with advertising materials on the sets of test systems produced by the company in the printed and electronic forms.

In the poster session, the following were worthy of note:

The use of known color reactions for preparing test systems of different types; four posters dealt with this topic. The poster of Yu.A. Zolotov, V.M. Ostrovskaya, and O.G. Yushkova "Reagent Papers for the Determination of Palladium" presented the results of the study of a new series of indicator papers based on polydentate irregular pyrimidinearylformazanyl-substituted celluloses; the static exchange capacity for palladium and color transitions were studied; the effect of the acidity of the solution was examined; and the stability of palladium complexes in the presence of alkali, alkaline-earth, and platinum-group metals was revealed. E.I Morosanova and K.A. Loginova ("Test System for the Determination of Asymmetric *N*,*N*-Dimethylhydrazine") developed a test system based on the chromogenic redox reaction of the determined organic compound with silicic acid xerogels modified with molybdophosphoric heteropoly compounds. The test system was tested in NPO Mashinostroenie, the Institute of Biophysics of the Ministry of Public Health of the Russian Federation, and the Research Center of Toxicology and Regulation of Biological Preparations of the Ministry of Public Health of the Russian Federation. S.Yu. Doronin, R.K. Chernova, I.V. Myznikova, and N.N. Gusakova ("Test Methods for the Determination of Primary Aromatic Amines and Medicinal Preparations on Based on These Compounds") presented the results from the development of a new test method for aromatic amines. The method was based on the contrast reaction of their condensation with *p*-dimethylaminocinnamic aldehyde in the presence of sodium dodecyl sulfate. Three versions of test devices based on this reaction (indicator tubes, press forms, and the drop version) were proposed; it was demonstrated that the method can be used for the analysis of pharmaceutical preparations for genuineness, the determination of volatile aniline derivatives in air, and the determination of more than 20 aromatic amines in water at a level of the maximum permissible concentration. N.I. Yastrebova, R.K. Chernova, A.A. Se-vost'yanov, and M.A. Ivanova ("Test Methods for the Determination of Anionic Surfactants") proposed different new test systems (indicator papers, ready indicator solutions, and films) with the use of the highly contrast reaction of the cationic reagent 2,6-diphenyl-4-(4-dimethylaminostyryl)pyrylium chloride with different anionic surfactants.

The second topic worthy of note was the use of different matrices and techniques for the immobilization of reagents on the matrices. N.A. Gavrilenko, M.G. Mokrousov, N.G. Aksenova, and O.V. Dzhiganskaya ("Chemical Test Systems with the Use of the Polymethacrylate Matrix") presented the results of studies of a new material (polymethacrylate matrix) for the immobilization of organic reagents. Procedures were developed for the visual test determination of the total of heavy metals, iron(II and III), mercury(II), copper(II), nickel(II), and ascorbic acid. S.N. Shtykov and T.Yu. Rusanova ("Chitosan as the Matrix for the Development of Sensing Elements of pH Sensors") determined the optimal parameters for the preparation of new films based on chitosan, which can be used for the determination of pH in strongly acidic solutions after the immobilization of acid–base bisazo indicators. D.Yu. Marchenko and S.I. Petrov ("Combined Indicator Tubes for the Analysis of Solutions Based on Powdered Sorbents and Ultrathin Fused-Silica Fibers with Immobilized Reagents") developed combined indicator tubes for the determination of nitrates and nitrites by the reactions of the diazotization of anthranilic acid and the azocoupling with chromotropic acid on ultrathin fused-silica fiber. Combined indicator tubes for the determination of nitrates contain three reaction zones: the reduction zone, the indicator reaction zone, and the detection zone. For the determination of nitrites, only two reaction zones are necessary: the indicator reaction zone and the detection zone.

The third poster-topic was related to the information on ready-for-use test systems and portable photometric instruments recommended for rapid analysis. Yu.L. Shishkin and V.M. Ostrovskaya ("Development of a Complex of Portable Photometric Instruments") presented four models of portable devices (Unifot-lyum, Unifot-test, Unifot-skan, and Unifot-spektr) for the measurement of the absorbance and luminescence of solutions, their nephelometry and turbidimetry, for recording the spectra from indicator strips, and for determining the chromaticity parameters of samples. The mini-instruments are compact and can be use in field conditions. N.A. Fomin ("Rapid Control of the Concentration of Active Compounds in Working Solutions of Disinfectants") presented the data on commercially available test devices for the quality control of disinfectants directly before use in medical and other institutions. The analytical characteristics of ready test systems were described, and their trade names and the data on the inclusion of test devices in the State Registry of the medical-purpose products were presented.

The fourth topic was related to the use of chromaticity parameters in test systems. D.Yu. Marchenko and S.I. Petrov delivered the poster "Use of a Computer Chromaticity Control System for the Development of Test Systems for Chemical Analysis," and D.Yu. Marchenko, R.G. Koknaev, and E.B. Kachanov delivered the poster "Use of a Computer System for the Chromaticity Quality Control of Powders in Granular Metallurgy." The authors of these presentations are working to solve the problem of the combination of the subjective perception of the user of a test system with the objective measurement. The approach is based on the international chromaticity standard; chromaticity measurements are performed using a high-class scanner together with a computer, special software, and color references. The usability of the computer chromaticity control system was demonstrated with the examples of procedures for the test determination of nitrite ions and

sulfides and for finding inclusions in metallurgical powders.

The fifth topic was related to the use of test systems in the educational process. L.M. Kozlova, G.M. Beloliptseva, and R.K. Chernova ("Test Systems in General and Special Courses of the Department of Analytical Chemistry and Environmental Chemistry of the Chernyshevsky State University") noted that the curricula of general courses of analytical chemistry and certain special courses involve sections dealing with the consideration of test systems for the rapid determination of priority pollutants of water, soil, air, food, and biological materials. In the laboratory training course, the students at Chernyshevsky State University use different test systems: indicator papers, powders, tubes, and Microquant and Reflectoquant comparators (Merck, Germany); the works of the stuff of the department are introduced in the educational process. N.N. Gusakova, G.E. Ryazanova, T.V. Kholkina, Yu.V. Samokhina, and O.G. Khteranovich ("Test Methods for Analysis in the Training Course in Analytical Chemistry for Students of Agricultural Universities") demonstrated the importance of the use of test systems in the training courses in analytical chemistry for students of agricultural engineering specialties for the determination of pollutants in air at farms and agricultural equipment repair shops, for the quality control of pesticide solutions, for the rapid analysis of waters of different types, and for the screening analysis of soils. Presentations dealing with the use of luminescence, thin-layer chromatography, piezoelectric quartz sensors, and ultradisperse diamonds were also delivered.

Further prospects for the development of test methods for chemical analysis were outlined in the closing speech of Yu.A. Zolotov. He noted that the symposium once again called the attention of the researchers to this important field of chemical analysis, and raised controversial issues related to terminology and the reasons for developing the registry of test devices. Special attention was given to the practical use of known test systems and the search for customers for the efficient solution of particular analytical problems. In this respect, the introduction of test systems in environmental science oriented disciplines in school and university curricula is promising.

R.K. Chernova and N.N. Gusakova

Dear Subscriber,

The article "Packed column supercritical fluid chromatography with splitless flame ionization detection" by Thurbide K.B. and Gilbert, S, was erroneously published in the 10/2004 issue of the Journal of Analytical Chemistry. The article may be found in the Canadian Journal of Chemistry, 82 (2004) 479-82, and all citations to the article should be to that Journal. The publisher regrets this error and apologizes to the authors and to our readers for any inconvenience this may cause.

Please place a copy of this letter inside your copy of the 10/2004 issue of the Journal of Analytical Chemistry over the first page of the referenced article (page 950). Thank you very much for your cooperation.