

**ANNUAL REPORT**  
**on Work of COOMET TC 1.8 “Physical Chemistry”**  
**for 2009**

**1. GENERAL CHARACTERISTIC OF THE COOPERATION IN THE FIELD OF PHYSICAL CHEMISTRY**

**COOMET TC 1.8 Members:**

The TK 1.8 consist of the representatives from national metrological organizations of the COOMET member-countries: Azerbaijan (AZSTANDART), Armenia (ZAO “NIM”), Belarus (BelGIM), Germany (PTB), Georgia (GeoStandMetrology), Kazakhstan (KazInMetr), Kyrgyzstan (NISM), KNDR (CIM), Cuba (INIMET), Lithuania (VMT), Moldova (INSM), Rumania (NIM), Russia (VNIIM), Slovakia (SMU), Uzbekistan (SE “CNS”), Ukraine (Ukrmetrteststandart).

**In 2008/2009, the work of COOMET TC 1.8 “Physical Chemistry” was carried out in the following directions:**

- Organization and realization of the work on the preparation of the NMI CMC data of the COOMET Member States that have signed the MRA.
- Organization and realization of the internal review of CMC for COOMET NMIs and the interregional review of NMI CMCs for other regional metrological organizations.
- Planning and organizing of international comparisons and interlaboratory researches.
- Getting the TC 1.8 Members acquainted with the CCQM and COOMET documents aimed at the realization of the MRA.
- Improvement of the TC 1.8 structure.
- Promotion in rendering metrological services in the field of physical-chemical measurements.

**2. TC WORKS ON THE COOMET PROJECTS**

**VNIIM is the coordinator of:**

- 1 COOMET Project № 400/RU/07 “Key comparisons of standard natural gas samples”. The Project is agreed and registered in the KCDB as COOMET.QM-K23.b “Standard Reference Materials — Synthetic Natural Gas”. Participants: VNIIM (Russia), BelGIM (Belarus), BAM (Germany), SMI (Czech. Rep.), SMU (Slovakia), Ukrmetrteststandart (Ukraine). This Project is completed. The Report, Draft A was sent to all participants and to COOMET Secretary.
- 2 COOMET Project № 401/RU/07 “Key comparisons of standard samples of CO gas mixtures in Nitrogen (100 and 1000 ppm)”. The Project is agreed and registered in the KCDB as COOMET.QM-K1.a “Standard Reference Materials — Gas Mixtures CO in Nitrogen”. Participants: VNIIM (Russia), BelGIM (Belarus), BAM (Germany), Ukrmetrteststandart (Ukraine). The Project is completed. The Report, Draft A was sent to all participants and to COOMET Secretary.
- 3 COOMET Project № 435/RU/08 “Pilot comparisons in the field of aerosol particles mass concentration measurement”. Participants: VNIIM, VNIIFTRI (Russia) and other COOMET member countries. This is the Project proposed. The Technical Protocol was sent to participants.
- 4 COOMET Project № 361/RU/06 “Pilot comparisons in the field of electrical conductivity measurements”. Participants: VNIIM (Russia), VNIIFTRI (Russia), BelGIM (Belarus),

Ukrmetrteststandart (Ukraine), SMU (Slovakia). This is the Project agreed. Samples for comparisons have been dispatched to participants. The obtained protocols of comparisons are being analyzed.

5 COOMET Project № 362/RU/06 “Comparisons in the field of measuring the aqueous glucose standards”. Participants: VNIIM (Russia), BelGIM (Belarus). This is the Project agreed. The Technical Protocol was sent to participants. Adjustment of comparison technology is been performed.

6 COOMET Project № 375/RU/06 Pilot comparisons “Determination of gene-modified objects in food”. Participants: VNIIM (Russia), RAS Institute of Cytology (Russia), BelGIM (Belarus). This is the Project agreed. Preparation of the samples is in process. Researches aimed at confirmation of the substance purity are being carried out.

7 COOMET Project № 367/RU/06 “Pilot comparisons in the field of blood elements studies”. This is the Project proposed. The form of this proposed Project have been sent to participants repeatedly (September, 2009).

8 COOMET Project № 483/RU/09 “Key comparisons of primary standards of concentration of component gas media — NO in Nitrogen (100 and 1000  $\mu\text{mol/mol}$ ). This is the Project proposed.

9 COOMET Project 484/RU/09 “Key comparisons of primary standards of concentration of components in gas media — SO<sub>2</sub> in Nitrogen (100 and 1000  $\mu\text{mol/mol}$ ). This is the Project proposed.

#### **VNIIFTRI is the coordinator of:**

10 COOMET Project № 421/RU/08 “The additional comparison of pH working standards”. Participants: VNIIFTRI, VNIIM, UNIIM, NISM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), KazInMetr (Kazakhstan), CSMs of Russian Federation: Novosibirsky, Nijegorodsky, Rostovsky, Ekaterinburgskt, Khabarovsk, Rostest-Moscow, Test-St.Petersburg, UralTest. The Project is completed. The Final Report was sent to COOMET Secretary.

#### **UNIIM is the coordinator of:**

11 COOMET Project № 436/RU/08 “Pilot comparisons in the field of moisture mass fraction measurements in barley cereal grain”. Participants: UNIIM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), SP Technical Research Institute of Sweden (Sweden), PTB (Germany), KazInMetr (Kazakhstan). Samples have been prepared and dispatched to participants. Results of measurements have been obtained; Report A has been sent to the participants

12 COOMET Project № 211/RU/06 “Carrying out interlaboratory comparisons on the determination of toxic microimpurities in vodkas”. Participants: UNIIM (Russia), VNIIM (Russia) and others. This is the Project proposed.

13 COOMET Project № 479/RU/09 “Supplementary comparisons in the field of moisture mass fraction measurements in cereal grain and cereal products”. Participants: UNIIM (Russia), Ukrmetrteststandart (Ukraine), BelGIM (Belarus), SP Technical Research Institute (Sweden), PTB (Germany) and other COOMET member countries. This is the Project proposed.

## **Other COOMET PROJECTS. COOMET TC 1.12 is the coordinator of:**

- 14 COOMET Project № 293/RU/03 “Development of CRMs for comparison of dry residue of Baikal water SOVB-1, birch leaf LB-1, mixture of meadow herbs Tr-1, Canadian pond weed EK-1 and perch tissue Bok-2”. Participants: BelGIM (Belarus), BAM (Germany), KazInMetr (Kazakhstan), IGC SB of RAS, VNIIM (Russia). The Project is completed. The VNIIM received a certificate of the international comparisons participant.

### **3. RESULTS of the LAST MEETING of TC 1.8**

The last meeting of COOMET TC 1.8 “Physical chemistry” was held in May, 13-14, 2009. The representatives from Russia (VNIIM, VNIIFTRI, VNIIOFI, UNIIM), Azerbaijan (Azstandart), Belarus (BelGIM), Ukraine (Ukrmetrteststandart) took part in this meeting. The meeting decisions were included into the Protocol (attached).

### **4. REVIEW of the PROJECTS COMPLETED**

Three Projects were completed in 2009:

- 1) COOMET Project № 400/RU/07 (COOMET.QM-K23.b). The final report is at the stage of agreement with the chairman of the Working Group on Gas Analysis (CCQM);
- 2) COOMET Project № 401/RU/07 (COOMEN.QM-K1.a). final report is at the stage of agreement with the chairman of the Working Group on Gas Analysis (CCQM);
- 3) COOMET Project № 293/RU/03. The CRMs are registered in the COOMET CO Register;
- 4) COOMET Project № 421/RU/08 RM Register. The Final Report was sent to COOMET Secretary.

### **5. COOPERATION with INTERNATIONAL and REGIONAL ORGANIZATIONS**

Participation of the representatives of TC 1.8 “Physical chemistry” was organized in the following events:

#### **CCQM**

- 15<sup>th</sup> meeting of the CCQM (1 specialist from VNIIM) (Paris, April, 2009)
- meetings of the Working Groups of the CCQM (5 specialists from VNIIM, 2 specialists from UNIIM):
  - on Key Comparisons and CMC Quality (KCWG) (Paris, April, 2009)
  - on Gas Analysis (GAWG) (Paris, April, 2009)
  - on Organic Analysis (OAWG) (Paris, April, 2009)
  - on Inorganic Analysis (IAWG) (Paris, April, 2009)
  - on Bioanalysis (BAWG) (Paris, April, 2009)
- CCQM Workshop (2 specialists from VNIIM) (Paris, April, 2009)
- APEC Workshop on Strengthening Chemical Metrology Infrastructure — Part II (Singapore, August, 2009)
- ANMET-APEC Seminar on Traceability in Materials Testing to Reduce Technical Barriers to Trade (Travel Undertaking) (Taiwan, September, 2009)

#### **GAS-2009 International Symposium and Exposition:**

- participation in Symposium (1 specialist from VNIIM) (The Netherlands, February, 2009)

## 6. ACTIVITIES FOR IMPLEMENTATION of MRA

### I. Organization and realization of works on preparation of the CMC data

- 1 The COOMET review of CMCs for cycle X was completed. The results were published in Appendix C (MRA), at that 1 new position on the gas analysis, 9 new positions on the inorganic analysis of the VNIIM, 3 new position on electrochemical analysis of the Ukrmetrteststandart were introduced.
- 2 At present, the International CMC Database (Appendix C) contains 243 positions of VNIIM, 4 positions of UNIIM, 7 positions of VNIIFTRI, 7 positions of Ukrmetrteststandart, 2 positions of BELGIM.

Distribution of the COOMET CMCs according to measurement categories is the following: gas analysis — 185; organic solution — 21; inorganic solution — 13; metals — 16; sediments, soils, ores and particles — 4; biological fluids and materials — 0; high purity chemicals — 3; foods — 5; water — 1; advanced materials — 0; electrochemical analysis — 15.

- 3 Arrangements made for the COOMET CMCs review of cycle XI are as follows:

- It was completed the intraregional review of the COOMET CMCs claimed by:
  - VNIIM (Russia): in the field of gas analysis (12 new positions, 6 corrected former positions and 1 deleted former position), inorganic analysis (17 positions);
  - Ukrmetrteststandart: in the field of gas analysis (2 new positions);
  - BELGIM: in the field of gas analysis (2 new positions);
  - UNIIM in the field of high purity chemicals (1 position).
- Reviewers: SMU (Slovakia), Ukrmetrteststandart (Ukraine), BELGIM (Belarus);
- All CMCs were presented for interregional review.

### II. Participation of COOMET NMIs in international comparisons and interlaboratory researches

Planning and organization of participation of the active COOMET member-states in the international (key and pilot) comparisons are provided.

#### CCQM, BIPM and EUROMET comparisons:

Comparison	COOMET NMI	Status
CCQM-K66 “Purity analysis of Methane”	VNIIM (Russia)	Preliminary report
CCQM-K65 “Mercaptans in methane”	VNIIM (Russia) — <b>coordinator</b>	Final Report
CCQM-K68 “N <sub>2</sub> O at ambient level”	VNIIM (Russia)	Report, Draft A
CCQM-K71 “Stack Gas mixture”	VNIIM (Russia)	Report, Draft A
CCQM-K74 “Nitrogen dioxide (10 μmol/mol) in Nitrogen”	VNIIM (Russia)	In progress
CCQM-K76 “Sulfur dioxide (10 μmol/mol) in Nitrogen”	VNIIM (Russia)	Planned
CCQM-P91 “Pyrethroids in apple juice”	VNIIM (Russia)	Report, Draft A
CCQM-P113 “Relative quantification of genomic DNA fragments extracted from a biological tissue”	VNIIM (Russia)	Final Report

<b>Comparison</b>	<b>COOMET NMI</b>	<b>Status</b>
CCQM-P102 “Quantification of cells with specific phenotypic characteristics”	VNIIM (Russia)	Planned
CCQM-P100.3 “Determination of low levels of Hg in natural water”	VNIIM (Russia)	Report was sent to coordinating laboratory
CCQM-P119 “Lead in solder”	VNIIM (Russia)	Final Report
CCQM-P111 “Seawater salinity”	VNIIM, VNIIFTRI (Russia), Ukrmetrteststandart (Ukraine)	Final Report
CCQM-P118 “Toxic Metals in Algae	VNIIM (Russia)	Preliminary report
CCQM-P94.1 “Quantification of DNA methylation”	VNIIM (Russia)	In progress
CCQM-K79 “Comparison of value-assigned CRMs and Proficiency Testing Materials for Ethanol in Aqueous Matrix, 0.1 mg/g to 500 mg/g”	VNIIM (Russia)	Samples with certificates was sent to coordinating laboratory
CCQM-K34.2 “Assay of Potassium hydrogen phthalate”	VNIIM (Russia)	Final Report
EURAMET 934 “TILSAM method”	VNIIM (Russia)	In progress
EURAMET 1092 “Ethanol in Nitrogen”	VNIIM (Russia)	Report was sent to coordinating laboratory
APMP.QM-P14 “Benzoic acid and sorbic acid content in curry paste”	VNIIM (Russia)	In progress
APMP.QM-K41 “H <sub>2</sub> S in Nitrogen”	VNIIM (Russia)	In progress

**7. INFORMATION on a PROSPECTIVE PLACE and DATE for the FOLLOWING MEETING**

The next meeting of TC 1.8 “Physical chemistry” will be held in September, 16-17, 2010 (St. Petersburg, VNIIM).

Prof. L.A. Konopelko  
Chairman of COOMET TC 1.8 “Physical chemistry”

Enclosure: Protocol of the COOMET TC 1.8 “Physical Chemistry” meeting, which held in May, 13-14, 2009.