

**ANNUAL REPORT of  
COOMET TC 1.8 “Physical Chemistry” to CCQM  
for 2009-2010**

## **1 GENERAL INFORMATION**

Activities of the COOMET Technical Committee 1.8 «Physical Chemistry» covers those measurement services, which could be referred to «Metrology in chemistry» category.

### **COOMET TC 1.8 members**

There are represented 22 NMIs from 17 COOMET Member-Countries in TC 1.8 now. They are: AZSTANDART (Azerbaijan), NIM (Armenia), BelGIM (Belarus), BIM (Bulgaria), PTB and BAM (Germany), KazInMetr (Kazakhstan), NISM (Kyrgyzstan), CIM (KNDR), INIMET (Cuba), VMT (Lithuania), INSM (Moldova), INM (Romania), VNIIM, VNIIFTRI, UNIIM, VNIIOFI VNIIMS (Russia), SMU (Slovakia), Ukrmetrteststandart (Ukraine) as well as CNS Uz (Uzbekistan) and GEOSTM (Georgia).

**In 2009/2010, 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 1.8 PROJECTS**

The NMIs of the COOMET Member States as well as interested metrological centers and designated laboratories of other countries that have an appropriate basis of standard equipment can take part in the TC projects connected with carrying out of international comparisons and pilot researches.

**VNIIM is the coordinator of:**

1. COOMET Project № 400/RU/07 “Key comparison 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 Final Report is under discussion.

2. COOMET Project № 401/RU/07 “Key comparison 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 Final Report is placed in the BIPM database.

3. COOMET Project № 435/RU/08 “Pilot comparison in the field of aerosol particles mass concentration measurement”.

Participants: VNIIM, VNIIFTRI (Russia) and other COOMET member countries.

This is the proposed Project. The Technical Protocol was sent to participants.

4. COOMET Project № 361/RU/06 “Pilot comparison in the field of electrical conductivity measurements”.

Participants: VNIIM (Russia), VNIIFTRI (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), SMU (Slovakia).

The Project is completed.

5. COOMET Project № 362/RU/06 “Pilot comparison in the field of measuring the aqueous glucose standards”.

Participants: VNIIM (Russia), BelGIM (Belarus).

This is the agreed Project. The Technical Protocol was sent to participants. Adjustment of comparison technology is been performed.

6. COOMET Project № 375/RU/06 Pilot comparison “Determination of gene-modified objects in food”.

Participants: VNIIM (Russia), RAS Institute of Cytology (Russia), BelGIM (Belarus).

This is the agreed Project. The samples are prepared for dispatch.

7. COOMET Project № 367/RU/06 “Pilot comparison in the field of blood elements studies”.

This is the proposed Project. The form of this Project have been sent to participants repeatedly (September, 2009).

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

Participants: VNIIM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine) and other COOMET member countries.

This is the proposed Project.

9. COOMET Project № 484/RU/09 “Key comparisons of primary standards of concentration of components in gas media — Sulphur dioxide in Nitrogen (100 and 1000 µmol/mol).

Participants: VNIIM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine) and other COOMET member countries.

This is the proposed Project.

10. COOMET Project № 493/RU/10 Bilateral comparison «Determination of fullerenes C<sub>60</sub> and C<sub>70</sub> mass fraction in fullerene concentrate”.

Participants: VNIIM (Russia), BAM (Germany).

This is the proposed Project.

**VNIIFTRI is the coordinator of:**

11. COOMET Project № 421/RU/08 “The pilot comparison of pH working standards”.

Participants: VNIIFTRI, VNIIM, UNIIM, NISM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), KazInMetr (Kazakhstan), Standardization and Metrology Centers of Russian Federation: Novosibirsky, Nijegorodsky, Rostovsky, Ekaterinburgskt, Khabarovsky, Rostest-Moscow, Test-St.Petersburg, UralTest.

The Project is completed. The Final Report was sent to COOMET Secretary.

**UNIIM is the coordinator of:**

12. 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; Final Report has been sent to the participants.

13. 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 proposed Project.

14. 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 proposed Project.

### **3 COOPERATION WITH THE INTERNATIONAL ORGANIZATIONS**

#### **CCQM**

Representatives of TC 1.8 have participated in CCQM activity practically since the time of its establishment and became the members of the working groups KCWG (Key Comparison working group), QAWG (Organic Analysis working group), GAWG (Gas Analysis working group), IAWG (Inorganic Analysis working group), BAWG (Bio Analysis working group), EAWG (Electrochemical Analysis working group) with the purpose of International System of Uniformity of Measurements formation.

#### **APMP**

Since 2008 VNIIM (Russia) has become the full member of APMP, KazInMetr (Kazakhstan) is an associated member of this Regional Metrological Organization.

At present VNIIM participates in the two projects of APMP in the field of Metrology in Chemistry.

#### **EURAMET**

VNIIM is an associated member of EURAMET. Cooperation with TC Metchem EURAMET consists mainly of participation in the projects of international comparisons and realization of bilateral agreements with NMIs of EURAMET Member-Countries.

#### **APEC, ANMET**

Cooperation of TC 1.8 with these organizations in 2009 was realized within active workshops:

- “Strengthening Chemical Metrology Infrastructure”, Singapore;
- “Traceability in Material Testing to Reduce Technical Barriers to trade”, China, Shanghai.

#### **ISO TCs**

Representatives of TC 1.8 participate in development of standards and carry out an expertise in the ISO TC 146 “Air Quality”, TC 158 “Gas Analysis”, TC 190 “Soil Quality”, TC 193 “Natural Gas”.

#### **OIML**

Representatives of VNIIM and VNIIFTRI are the heads of OIML TC 17 “Physical-chemical measurements” and its sub-committees (SCs) (SC 2 “Saccharimetry”, SC 3 “pH-metering”, SC 4 “Conductometry”, SC 5 “Viscosimetry”, SC 6 “Gas Analysis”, and participate in development and expertise of standards.

### **4 ACTIVITIES ON 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; 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)	Report, Draft A
CCQM-K65 “Mercaptans in methane”	VNIIM (Russia) — <b>coordinator</b>	Final Report in KCDB
CCQM-K68 “N <sub>2</sub> O at ambient level”	VNIIM (Russia)	Report, Draft B
CCQM-K71 “Stack Gas mixture”	VNIIM (Russia)	Report, Draft B
CCQM-K74 “Nitrogen dioxide (10 μmol/mol) in Nitrogen”	VNIIM (Russia)	Report, Draft B
CCQM-K76 “Sulfur dioxide (10 μmol/mol) in Nitrogen”	VNIIM (Russia)	In progress
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
CCQM-K77 “Synthetic refinery gas”	VNIIM (Russia)	In progress
CCQM-P100.3 “Determination of low levels of Hg in natural water”	VNIIM (Russia)	Report, Draft A
CCQM-P119 “Lead in solder”	VNIIM (Russia)	Final Report
CCQM-P111 “Seawater salinity”	VNIIM (Russia), Ukrmetrteststandart (Ukraine)	Final Report
CCQM-P118 “Toxic Metals in Algae”	VNIIM (Russia)	Report, Draft A

Comparison	COOMET NMI	Status
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)	Report, Draft A
CCQM-K34.2 “Assay of Potassium hydrogen phthalate”	VNIIM (Russia)	Final Report
EURAMET 934 “TILSAM method”	VNIIM (Russia)	In progress
EUROMET.QM-K4 “Ethanol in Nitrogen”	VNIIM (Russia)	Report, Draft A
APMP.QM-P14 “Benzoic acid and sorbic acid content in curry paste”	VNIIM (Russia)	The results of measurements are sent to the coordinator
APMP.QM-K41 “H <sub>2</sub> S in Nitrogen”	VNIIM (Russia)	In progress

## 5 MEETINGS AND EVENTS

- The last meeting of COOMET TC 1.8 “Physical chemistry” was held in May, 13-14, 2009.
- International Scientific and Practical conference “Metrology–2009” April 14-15, 2009, Minsk, Belarus;
- 3<sup>rd</sup> International Competition “The Best Young Metrologist of COOMET 2009” April 14-15, 2009, Minsk, Belarus;
- International Seminar “Mathematics, statistics and computation to support measurement quality”, 30.06.2009–02.07.2009, COOMET, St. Petersburg, Russia;
- 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.