

ANNUAL REPORT
ON WORK OF COOMET TC 1.8 “PHYSICO-CHEMISTRY”
FOR 2015-16

I. GENERAL CHARACTERISTIC OF THE COOPERATION IN THE FIELD OF PHYSICO-CHEMISTRY

COOMET TC 1.8 Members:

The TK 1.8 consists of the representatives from national metrological organizations of the COOMET member-countries: AZSTANDART (Azerbaijan), NIM (Armenia), BelGIM (Belarus), BIM (Bulgaria), PTB and BAM (Germany), GEOSTM (Georgia), KazInMetr (Kazakhstan), NISM (Kyrgyzstan), CIM (KNDR), INIMET (Cuba), VMT (Lithuania), INSM (Moldova), INM (Romania), VNIIM, VNIIFTRI, UNIIM, VNIIOFI, VNIIMS (Russia), SMU (Slovakia), Tajikistan (Tajikstandart), CNS Uz (Uzbekistan), Ukrmetrteststandart (Ukraine),

In 2015-16 the work of COOMET TC 1.8 “Physico-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.
- Promotion in rendering metrological services in the field of physical-chemical measurements.

II. TC WORKS ON THE COOMET PROJECTS

Works on COOMET projects in the field of the international of key and pilot comparisons is carried out at coordination of VNIIM, UNIIM and VNIIFTRI.

VNIIM is the coordinator of:

1. COOMET Project 576/RU/12. «Supplementary comparison of national standards in the field of analysis of gas mixture of CO₂, CO, C₃H₈ in nitrogen (automotive emission gases)». Participants: VNIIM, KazInMetr, BelGIM, Ukrmetrteststandart and BAM. Status of the comparison is changed

- from 'Key' to 'Supplementary' in accordance with recommendations of GAWG CCQM. Final report is prepared.
2. COOMET Project 615/RU/13 (COOMET.QM-K93). «Key comparison in the field of measurements of mass fraction of ethanol in nitrogen». Participants: VNIIM (Russia) and Ukrmetrteststandart. Final report is prepared.
 3. COOMET Project 596/RU/13. Pilot comparison «Pesticides in tea». Participants: VNIIM, BelgIM, Ukrmetrteststandart, KazInMetr, CSM ME and some other participants from Russia. Final report is prepared.
 4. COOMET Project 622/RU/13. Supplementary comparison «C₃-C₅ components in mixtures of liquefied hydrocarbons». Participants: VNIIM, BelgIM, Ukrmetrteststandart, KazInMetr. Deferred to 2016.
 5. COOMET Project 611/RU/13. Pilot comparison «Melamine in milk powder». Participants: VNIIM, BelgIM, Ukrmetrteststandart, KazInMetr. Status of the Project is «proposed». The samples for distribution are prepared.
 6. COOMET Project 519/RU/11. «Pilot comparison in the field of measurements of ethanol mass fraction in aqueous solutions». Participants: VNIIM, Ukrmetrteststandart, CSM ME, INSM. Draft of final report is to be prepared.
 7. COOMET Project 649/RU/14 Pilot comparison «Study in the field of measuring of formed elements of blood: erythrocytes (RBC), leukocytes (WBC)» Participants: VNIIM, CSM ME. Draft report is sent to CSM ME for agreement.
 8. COOMET Project 654/RU/14. «Pilot comparison in the field of measurements in human serum. Cholesterol in human serum». Participants: VNIIM, CSM ME. The pilot laboratory is preparing comparison samples.
 9. COOMET project 664/RU/14. (COOMET.QM-S3.2015) Supplementary comparison of standard gas mixtures «Atmospheric air pollutants: CO in Nitrogen, 5 µmol/mol» Participants: VNIIM, KazInMetr, BelgIM. The Draft A report is prepared.
 10. COOMET project 678/RU/15. (COOMET.QM-K111) Key comparison of national measurement standards in the field of analysis of gas mixture of C₃H₈ in nitrogen. Participants: VNIIM, KazInMetr, BelgIM, Ukrmetrteststandart. Comparison samples are sent to the participants.
 11. COOMET project XXX/RU/16. Pilot comparison «Determination of polychlorinated dibenzo-p-dioxins and dibenzofurans in fat matrices (pork fat)». Participants: VNIIM, PTB, BelgIM, Ukrmetrteststandart, CSM ME. The samples are ready for delivery to participants. The protocol is sent for registration in COOMET.

UNIIM is the coordinator of:

1. COOMET Project 645/RU/14. Pilot comparisons in the field of measuring of mass fraction of copper and impurities in the oxygen-free copper wire rod KMB M001b brand for determination of copper purity. Participants: UNIIM, Ukrmetrteststandart, KazInMetr. Draft A report is sent to the participants for agreement.
2. COOMET Project 672/RU/15. Pilot comparisons in the field of measuring the mass fraction of iron in iron. Participants: UNIIM, others. Measurements in progress.

VNIIFTRI is the coordinator of:

1. COOMET Project 573/RU/12. Pilot comparison in the field of measurements of count concentration of air ions. Participants: VNIIM, VNIIFTRI and KazInMetr. Measurements in progress.
2. COOMET Project 574/RU/12. Pilot comparison in the field of measurements of count concentration of aerosol particles in the range of sizes from 0,5 μ m and higher. Participants: VNIIM, VNIIFTRI and KazInMetr. Measurements in progress.
3. COOMET Project 575/RU/12. Pilot comparison in the field of measurements of count concentration of aerosol nanoparticles in the range of sizes from 20 to 500 nm. Participants: VNIIM, VNIIFTRI and KazInMetr. Measurements in progress.
4. COOMET Project 655/RU/15. Pilot study on pH measurement of phosphate buffer (pH~7.0). Participants: VNIIFTRI, KazInMetr, CSM ME. Preparation to the comparison.

III. RESULTS OF THE LAST MEETING OF TC 1.8

The last meeting of TC 1.8 «Physico-Chemistry» was held in VNIIM in May 21-22.05.2015 r.

The representatives from Azerbaijan (AZSTANDART), Belarus (BelGIM), Kazakhstan (KazInMetr), Kyrgyzstan (CSM ME), Russia (VNIIM, VNIIFTRI, UNIIM), Ukraine (Ukrmetrteststandard) took part in the meeting. The meeting decisions were included into the Minutes (attached).

IV. REVIEW OF THE PROJECTS COMPLETED

The following Projects were completed in 2015-16:

1	540/UA-a/11 (COOMET.QM-K36).	Key comparison «Electrolytic conductivity 0,5 CM/M». Participants: BelGIM (Belarus), GEOSTM (Georgia), KasInMetr (Kazakhstan), INDECOPI (Peru), SMU (Slovakia); Ukrmetrteststandart (Ukraine), VNIIM (Russia), VNIIFTRI (Russia)
2	562/RU/12	Pilot comparison in the field of measurements of mass fraction of metals (Cu, Zn, Pb, Al, Ca, Sb, Mg, Au, Ag, As, Ni) in metallurgical slag. Part 1. Participants: UNIIM (Russia), VNIIM (Russia), VNIIOFI (Russia), Ukrmetrteststandart (Ukraine).
3	583/RU/12	Pilot comparison «Determination of dissolved oxygen in water in the wide range». Participants: VNIIFTRI (Russia), VNIIM (Russia), BelGIM (Belarus).
4	608/RU/13 (COOMET.QM-S3)	Supplementary comparison «Gravimetry production of CO in Nitrogen (3 μ mol/mol)». Participants: VNIIM (Russia), Inmetro (Brazil).
5	613/RU-a/13	Pilot comparison in the field of measurements of porosity properties (specific adsorption, specific surface area, specific volume and pore diameter) in solid nanoporous substances. Participants: UNIIM (Russia), VNIIM (Russia).
6	650/RU/14	Pilot comparisons in the field of metals mass fraction measurements (Al, As, Ca, Mg, Pb, Sb, Au, Ag, Ni) in slag. Part II. Participants: UNIIM (Russia), VNIIOFI (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), KazInMetr (Kazakhstan).

V. COOPERATION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS

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

1. CCQM and its working groups meetings

- 20-th meeting of the CCQM - 1 specialist from VNIIM (Paris, April, 2015)
- meetings of the Working Groups of the CCQM - 11 specialists (VNIIFTRI, VNIIM, UNIIM):
 - on Key Comparisons and CMC Quality (Paris, April 2015)
 - on Gas Analysis (Paris, April 2015)
 - on Organic Analysis (Paris, April 2015);
 - on Bioanalysis (Paris, April 2015)
 - on Inorganic Analysis (Paris, April 2015);
 - on Electrochemistry (Paris, April 2015).

2. 13-th meeting of Joint Committee for measurement standards and 25-th meeting of COOMET Committee (26-28 May 2015, Khudjand, Tajikistan).

VI. ACTIVITIES FOR IMPLEMENTATION OF MRA

1. Organization and realization of works on preparation of the CMC data:

The review of cycle XVI COOMET CMCs was completed.

The results published in the BIPM KCDB are as follows:

7 new and 11 revised positions in the field of gas analysis (1 position is deleted), 3 new positions in the field of inorganic analysis (on the part of VNIIM);

2 new positions in the field of electrochemical analysis (on the part of BelGIM);

1 new position in the field of electrochemical analysis (on the part of KazInMetr).

At present the International CMC Database (BIPM KCDB) contains 534 positions of VNIIM, 17 positions of UNIIM, 5 positions of VNIIFTRI, 24 positions of Ukrmetrteststandart, 17 positions of BelGIM, 1 position of KazInMetr.

Distribution of the COOMET CMCs according to measurement categories is the following:

gas analysis – 452; organic solutions – 24; inorganic solutions – 15; metals – 14; sediments, soils, ores and particles – 9; high purity chemicals – 30; biological fluids and materials – 1; foods – 8; water – 9; electrochemical analysis – 21, advanced materials – 12, other materials – 3.

Arrangements made for the COOMET CMCs review of cycle XVII are as follows:

The intraregional review was completed.

The CMCs were claimed by

- VNIIM in the field of gas analysis (33 new), organic analysis (3 new in the category «biological fluids and materials»), electrochemical analysis (1 new) and inorganic analysis (1 revised in the category «biological fluids and materials»);
- UNIIM in the field of inorganic analysis (12 new in the category «high purity chemicals»);
- VNIIFTRI in the field of electrochemical analysis (1 new and 1 revised);
- BelGIM in the field of gas analysis (3 revised);
- Ukrmetrteststandart in the field of gas analysis (2 new and 3 revised) and in the field of electrochemical analysis (1 new);
- KazInMetr in the field of in gas analysis (3 new).

Reviewers: BelGIM, VNIIM, UNIIM, Ukrmetrteststandart.

All CMCs were presented for interregional review.

Note: CMC positions are shown as CMC lines.

2. Participation in international comparisons and interlaboratory studies

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

Comparison	COOMET NMI	Up-to-date status
CCQM-P123 - Cell quantification on solid substrate	VNIIM (Russia)	Draft A report
CCQM-K110 - Relative quantification of Bt63 in GM rice matrix sample	VNIIM (Russia)	Technical report
CCQM-P94.2 - Quantification of DNA methylation	VNIIM (Russia)	Final report
CCQM-K102 - Non-polar analytes in abiotic matrix: brominated flame retardants in sediment	VNIIM (Russia)	Draft A report
CCQM-K6.2 - Cholesterol in serum (subsequent comparison)	VNIIM (Russia)	Draft A report
CCQM-K11.2 - Glucose in Serum (subsequent comparison)	VNIIM (Russia)	Draft A report
CCQM-K12.2 - Creatinine in Serum (subsequent comparison)	VNIIM (Russia)	Draft A report
CCQM-K55d - Purity assessment of high purity organic materials: Folic Acid	VNIIM (Russia)	Preliminary results
CCQM-K109 - Urea and uric acid in serum	VNIIM (Russia)	In progress. Technical protocol is agreed.
CCQM-K131- Phthalates in PVC	VNIIM (Russia)	In progress. It's possible to change term to May, 2017.
CCQM-K124 - Trace elements and chromium speciation in drinking water	VNIIM (Russia)	Draft A report
CCQM-K127 - Toxic and trace elements in soils	VNIIM (Russia)	Preliminary results
CCQM-P149 - Estimation of impurities for the overall purity evaluation of zinc	VNIIM (Russia), VNIIM (Russia)	Final report
CCQM-K125 - Iodine and other elements in infant formula	VNIIM (Russia)	First draft of the report
CCQM-K99 - pH of phosphate buffer (pH 7.5)	VNIIFTRI (Russia), Ukrmetrteststandard (Ukraine)	Final report

Comparison	COOMET NMI	Up-to-date status
CCQM-K114 – Amount content of chloride in KCl	VNIIFTRI (Russia), UNIIM (Russia)	Draft A report
CCQM-P152 - pH in water/ethanol mixture	VNIIFTRI (Russia)	Draft B report
CCQM-P153 - Electrolytic conductivity in ethanol	Ukrmetrteststandard (Ukraine)	Draft B report
CCQM-P143 - Conductivity - preparative comparison	VNIIFTRI (Russia), Ukrmetrteststandard (Ukraine)	Final report
CCQM-K130 - Nitrogen mass fraction in glycine	UNIIM (Russia)	In progress
CCQM-P167 - Nitrogen mass fraction in milk powder	UNIIM (Russia)	In progress
CCQM-K84 – Ambient Carbon Monoxide	VNIIM (Russia)	Draft B report
CCQM-K94 – DMS in nitrogen	VNIIM (Russia)	Final report
CCQM-K101 - Oxygen in nitrogen at 10 $\mu\text{mol/mol}$	VNIIM (Russia)	Draft B report
CCQM-K90 – Formaldehyde in nitrogen	VNIIM (Russia)	Measurements completed
CCQM-K111 – Propane in Nitrogen	VNIIM (Russia)	Draft A report
CCQM-K112 – Composition of Biogas	VNIIM (Russia)	Draft A report
CCQM-K113 – Noble gas mixture	VNIIM (Russia)	Draft A report
CCQM-K116 – 10 $\mu\text{mol/mol}$ water vapour in nitrogen	VNIIM (Russia)	Measurements completed
CCQM-K119 – Liquefied Petroleum Gas	VNIIM (Russia)	In progress
CCQM-K118 - Natural gas	VNIIM (Russia)	Preparation to the comparison
CCQM-K131- Mass fraction of PAHs in acetone-trile in ng/g.	VNIIM (Russia)	Protocol complete.
BIPM.QM-K1 - Ozone at ambient level	VNIIM (Russia)	Final report
CCQM-P175 - Carbon stable isotope ratio delta values in honey	VNIIM (Russia)	In progress
EURAMET 1220 – Impurities in Hydrogen	VNIIM (Russia)	Measurements completed
Bilateral comparison (with KRISS) in the field of measurement of mass concentration of aerosol particles	VNIIM (Russia)	Correction of protocol

VII. INFORMATION ON A PROSPECTIVE PLACE AND DATE FOR THE FOLLOWING MEETING

The next meeting of TC 1.8 «Physico-chemistry» will be held in Saint-Petersburg (Russia), VNIIM.
The date of the meeting: 24-25 May 2016.

Chairman of COOMET TC 1.8 “Physico-chemistry”, Prof.



L.Konopelko

Attachment:

Minutes of the COOMET TC 1.8 “Physical Chemistry” meeting held in May, 21 - 22 2015.