

Annual Report of COOMET TC 1.8 “Physico-Chemistry” 2019 - 2020

1 GENERAL INFORMATION

Activities of the COOMET Technical Committee 1.8 “Physico-Chemistry” covers those measurement services, which could be referred to “Metrology in chemistry” category.

COOMET TC 1.8 members

26 NMIs from 21 COOMET Member-Countries are represented in TC 1.8 now. They are: AZSTANDART (Azerbaijan), NIM (Armenia), BelGIM (Belarus), IMBIH (Bosnia and Herzegovina), BIM (Bulgaria), PTB and BAM (Germany), GEOSTM (Georgia), KazInMetr (Kazakhstan), NISM (Kyrgyzstan), CIM (North Korea), INIMET (Cuba), VMT (Lithuania), INSM (Moldova), INM (Romania), NIM (China), TUBITAK UME (Turkey), VNIIM, VNIIFTRI, UNIIM, VNIIOFI, VNIIMS (Russia), SMU (Slovakia), Tajikstandart (Tajikistan), Ukrmetrteststandart (Ukraine) and CNS Uz (Uzbekistan).

In 2019/20 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.
- Improvement of the TC 1.8 structure.

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. The TC projects are coordinated at present by VNIIM, UNIIM, VNIIOFI.

VNIIM is the coordinator of:

- COOMET Project № 622/RU/13 (COOMET.QM-S4.2015) - Supplementary comparison "C3-C5 components in mixtures of liquified hydrocarbons". Participants: VNIIM, BelGIM, Ukrmetrteststandart. The final report is published.
- COOMET Project № 611/RU/13 - Pilot comparison "Melamine in milk powder". Participants: VNIIM, Ukrmetrteststandart, CSM ME (Kyrgyzstan). Draft B report is prepared.
- COOMET Project 654/RU/14 «Pilot comparison in the field of measurements in human serum. Cholesterol in human serum». Participants: VNIIM, VNIIOFI, CSM ME. Draft B report is prepared.
- COOMET Project 691/RU/16 «Pilot comparison «Determination of polychlorinated dibenzo-p-dioxins and dibenzofurans in fat matrix (pork fat)». Participants: VNIIM, BVL (Germany), and non-NMI labs. Final report is prepared.

- COOMET Project 708/RU/16 «Pilot comparison «Purity of anthracene». Participants: VNIIM, UNIIM. Draft B report is prepared.
- COOMET Project № 772/RU/18 Key comparison «Carbon dioxide in Airat urban level (480-800) $\mu\text{mol/mol}$ » Participants: VNIIM, BelGIM, Ukrmetrteststandart, KazInMetr, NMC/A*STAR, (Singapore). Measurements in progress.
- COOMET Project № 775/RU/19 Pilot comparison «Determination of the electrolytical conductivity of potassium chloride solutions at 20 S/m and 10 $\mu\text{S/cm}$ ». Participants: VNIIM, UNIIM, GEOSTM, BelGIM, NIM (Moldova), KazInMetr, «Sibprompribor-Analit»). Measurements of the samples by participants.

NIM of China/VNIIM as the Coordinators:

- COOMET Project XXX/RU/19: Pilot bilateral comparison “Measurement of water content in crude oil”. Participants: NIM and VNIIM. Preparation of the samples for comparison.

UNIIM is the coordinator of:

- COOMET Project 755/RU/18 Pilot comparison in the field of measuring the porosity of aluminum oxide by mercury porometry. Participants UNIIM; BAM (Germany). Draft B report is prepared.
- COOMET Project 754/RU/18 Pilot comparison in the field of measuring the porosity and gas permeability of rock formations. Participants: UNIIM, other NMIs of COOMET-member countries. Draft B report is prepared.
- COOMET Project 756/RU/18 Pilot comparison in the field of measuring the mass fraction of oxygen and nitrogen in steel; Participants: UNIIM, BAM. Draft A report.
- COOMET Project 782/RU/19 Pilot comparisons in the field of measuring of the mass fraction of moisture and protein in grain. Participants: UNIIM, BelGIM, Ukrmetrteststandart, KazInMetr and others. Draft A report.

VNIIOFI is the coordinator of:

- 1 COOMET Project 618/RU-a/13 Pilot comparison in the field of composition of Ni-based alloys Participants: VNIIOFI, UNIIM, BelGIM, Ukrmetrteststandart,, CSM ME (Kyrgyzstan). Measurements in progress.

Planned projects of TC 1.8 NMIs

Pilot NMI	Name	Type of comparison
VNIIM	Natural gas	COOMET key comparison
VNIIM	Quantitative determination of human DNA.	COOMET pilot study
VNIIM	Determining of biochemical parameters in urine samples	COOMET pilot study
VNIIM	Measurement of sulfur content in crude oil	COOMET pilot bilateral comparison (VNIIM/NIM)
VNIIFTRI	pX measurements of sodium ions activity, pNa \approx 1.1	COOMET Pilot study
VNIIFTRI	pH measurements of oxalate buffer solution, pH \approx 1.65	COOMET Pilot study
VNIIFTRI	pH measurements of phosphate buffer solution, pH \approx 7.0	COOMET Key comparison

3. RESULTS OF THE LAST MEETING OF TC 1.8

The last meeting of TC 1.8 «Physico-Chemistry» was held in VNIIM in May 22-23.05.2019. The representatives from Belarus (BelGIM), Ukrmetrteststandart (Ukraine), China (NIM), Kazakhstan (KasInMetr), Kyrgyzstan (CSM ME), Moldova (INSM), Uz NIM (Uzbekistan) and Russia (VNIIM, VNIIFTRI, VNIIMS, UNIIM) took part in the meeting. The meeting decisions were included into the Minutes (attached).

4 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 following working groups: KCWG (Key Comparisons working group), QAWG (Organic Analysis working group), GAWG (Gas Analysis working group), IAWG (Inorganic Analysis working group), PAWG (working group on Protein Analysis) NAWG (working group on Nucleic Acid Analysis), CAWG (working group on Cell Analysis), SAWG (working group on Surface Analysis), EAWG (Electrochemical Analysis working group).

APMP

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

In 2019-2020 VNIIM, VNIIFTRI and KasInMetr participated in APMP projects in the field of Metrology in Chemistry. In 2018 VNIIM and NIM organized bilateral comparison in the field of measuring of water content in crude oil which are currently ongoing.

EURAMET

Cooperation with TC Metchem EURAMET consists mainly of participation in the international comparisons and realization of bilateral agreements with NMIs of EURAMET Member-Countries.

In 2019 VNIIM, VNIIFTRI and UNIIM participated in the EURAMET projects in the Metrology in Chemistry field.

SIM

Ukrmetrteststandart participated in SIM project in the field of Organic Analysis.

ISO TC

Representatives of TC 1.8 participate in development of standards and carry out an expertise in the ISO TC 158 (Gas Analysis) and ISO TC 69 (Applications of statistical methods).

OIML

Representatives of VNIIM and VNIIFTRI are the heads of OIML TC 17 “Physico-chemical measurements” and its sub-committees (SC) (SC2 “Saccharimetry”, SC3 “pH-metering”, SC4 “Conductometry”, SC5 “Viscosimetry”, SC6 “Gas Analysis”, and participate in a development and expertise of the International Recommendations and Documents.

5 ACTIVITIES ON IMPLEMENTATION OF MRA

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

The review of cycle XX QM CMCs was completed. The results should be published in the BIPM KCDB*.

*Note - the delay of publication is due to the implementation of the new BIPM database – KCDB 2.0.

For COOMET they are as follows:

12 new positions and 7 positions deleted in the field of gas analysis, 1 new position in the field of bio analysis, 2 new positions in inorganics, 27 new, 20 revised and 4 deleted in organic analysis on the part of VNIIM;

4 new positions in the field of inorganic analysis on the part of VNIIFTRI;

1 new in the field of organics and 1 revised position in the field of inorganic analysis on the part of Ukrmetrteststandart;

19 new positions in the field of inorganics and 2 deleted in the organics field on the part of UNIIM.

At present, the International CMC Database (BIPM KCDB) contains 623 positions of VNIIM, 46 positions of UNIIM, 15 positions of VNIIFTRI, 34 positions of Ukrmetrteststandart, 19 positions of BelgIM, 7 positions of KazInMetr.

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

gas analysis – 516; organic solutions – 26; inorganic solutions – 15; metals – 14; sediments, soils, ores and particles – 21; high purity chemicals – 66; biological fluids and materials – 9; foods – 10; water – 13; electrochemical analysis – 24, advanced materials – 20, other materials – 10.

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

The intra-regional review was completed.

The CMCs were claimed by

VNIIM:

in the field of gas analysis – 3 new positions, 26 for revision, 12 to be deleted;

organic analysis – 6 revised positions and 14 to be deleted (organic solutions);

Ukrmetrteststandart:

in the field of gas analysis – 7 new positions, 9 for revision,
organic analysis -1 revised position (organic solutions),
inorganic analysis -5 new positions (food);

BelGIM:

in the field of gas analysis – 7 new positions, 8 for revision and 1 to be deleted,
electrochemical analysis -1 new position (pH);

UNIIM:

in the field of inorganic analysis – 5 new positions (food),
organic analysis - 5 to be deleted (organic solutions);

KazInMetr:

in the field of gas analysis – 2 new positions, 6 for revision.

Reviewers: representatives of VNIIFTRI, VNIIM, Ukrmetrteststandart, UNIIM.
All the CMCs were presented for interregional review.

Participation of COOMET NMIs in CCQM comparisons

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

In the period from April 2019 to April 2020

VNIIM participated in the most part of CCQM comparisons in the field of gas analysis (9 comparisons), organic analysis (7 comparisons), inorganic analysis (2 comparisons) and 1 comparison of NAWG.

VNIIFTRI participated in 4 comparisons in the field of electrochemical and inorganic analysis and in the field of charge, number and number concentration of particles (2 comparisons). VNIIFTRI is the coordinator of one of the CCQM key comparison in the electrochemical field.

UNIIM participated in 7 comparisons of IAWG and EAWG. UNIIM coordinated 2 CCQM key comparisons in the field of inorganics and electrochemistry.

VNIIMS participated in the comparisons of PAWG (1 comparison).

6 EVENTS AND MEETINGS

The last meeting of COOMET TC 1.8 “Physical chemistry” was held in May 22-23, 2019 (St. Petersburg, VNIIM);

The next meeting of TC 1.8 “Physical chemistry” will be held in October 06-07, 2020 (St. Petersburg, VNIIM).

The Chairman of COOMET
TC 1.8 “Physical chemistry”



Prof. L.A. Konopelko

February 2020