

Draft Minutes

Surface and Micro/Nano Analysis Working Group (SAWG)

25th Meeting

Hybrid Meeting on April 15th, 2026

Myria Room (BIPM) and Online

Draft Version 1, 15th July 2026

NOTE: All documents related to this meeting are on the SAWG website

<https://www.bipm.org/en/committees/cc/ccqm/wg/ccqm-sawg>

Participants:

CCQM-SAWG Chair

Dr Alexander Shard, NPL

CCQM-SAWG Vice-Chair

Dr Li-Lin Tay, NRC

In-person:

Dr Seung Mi Lee (KRISS, South Korea)
Dr Yaxuan Yao (NIM, China)
Dr Caterina Minelli (NPL, UK)
Dr Benjamin Reed (NPL, UK)
Dr Rainer Stosch (PTB, Germany)
Dr Michael Krumrey (PTB, Germany)
Dr Jorg Radnik (BAM, Germany)
Dr Andrea Mario Rossi (INRIM, Italy)
Dr Kazuhiro Kumagai (NMIJ/AIST, Japan)
Dr Egor Sobina (UNIIM, Russia)

Online:

Dr Ansoon Kim (KRISS, South Korea)
Dr Jeong Won Kim (KRISS, South Korea)
Dr Åsa Jämtning (NMIA, Australia)
Dr Jariya Buajareem (NMIT, Thailand)
Dr Donald Windover (NIST, USA)
Dr Ali Enis Sadak (TÜBİTAK, Türkiye)
Werner Jordaan (NMISA, South Africa)
Dr Bráulio Soares Archanjo, (INMETRO, Brazil)
Meriadoc Wilson (NMIA, Australia)
Dr Meiling Wang (NIM, China)
Dr Norma González (CENAM, Mexico)
Dr Yasushi Azuma (NMIJ/AIST, Japan)
Dr Rania Sayed (NIS, Egypt)
Dr Hai Wang (NIM, China)
Ivonne Gonzalez Cardenas (INM Colombia)
Dr Husnu Aslan (DFM, Denmark)
Dr Angela Hight-Walker (NIST, USA)
Dr Lulu Zhang (AIST, Japan)
Dr Froy Martinez (CENAM, Mexico)
Dr Ute Resch-Genger (BAM, Germany)
Dr Erman Karakuş (TÜBİTAK, Türkiye)
Dr Lingling Ren (NIM, China)

#	Action	Responsible Person/NMI/DI
2025-04_5	Dr Shard to request a study number for the traceable quantitative measurements of polymer weight fraction pilot study by the end of August 2025. Extended until pilot study is ready to be initiated. Dr Tay to inform Dr Shard when this is ready.	L-L. Tay (NRC)
2025-10_4	Dr Resch-Genger to circulate the protocol for P259 to SAWG members before the end of 2025 and contact Dr Shard regarding the logistics of running a CCQM-SAWG pilot study and VAMAS study in parallel.	U. Resch-Genger (BAM)
2025-10_5	Dr Tay to organise bilateral studies to assess sample robustness and transportability in the potential Raman pilot study before initiating the pilot study. Dr Rossi and Dr Hight Walker agreed to participate.	L-L. Tay (NRC)
2025-10_6	Dr Rossi to organise a meeting with Dr Tay, Dr Hight-Walker, and Dr Shard before the end of 2025 to discuss SAWG's interest in a leading a study in microplastics, including what materials and measurands such a study would focus on before the end of 2025.	A. Rossi (INRIM),
2026-04-1	Dr Sadak to distribute the K-136.2025 and P243 Draft A report to SAWG members by the end of April 2026.	A. Sadak (TÜBİTAK)
2026-04-2	All SAWG members to register as CMC reviewers in the KCDB.	All SAWG members
2026-04-3	Dr Shard and Dr Tay to draft a strategy document on acceptable evidence for CMC claims and develop a strategy for what evidence SAWG will accept for CMC claims without key comparisons, including pilot studies, peer-reviewed publications, and bilateral comparisons and circulate among SAWG members by the end of September 2026.	L-L. Tay (NRC) and A. Shard (NPL)
2026-04_4	CCQM-SAWG to reconvene in October 2026 for the Virtual 26 th CCQM-SAWG Meeting.	All SAWG members

Opening

Opening of the meeting

The Chair of the Surface Analysis Working Group (SAWG), Dr Shard welcomed everyone to the 25th SAWG meeting and briefly stated the CCQM and SAWG scope and remit.

Dr Krumrey announced that this will be his last SAWG meeting and will say some words at the end of the meeting. Dr Shard congratulated Dr Krumrey on staying the course with SAWG, and thanked him for his helpful and many contributions over the years. The SAWG members showed their appreciation.

Appointment of the Rapporteur

Dr Shard requested Dr Benjamin Reed (NPL, U.K.) to act as rapporteur for the April 2026 meeting. Dr Reed agreed to act as rapporteur.

Adoption of the agenda

The agenda for this meeting, titled “Final agenda CCQM SAWG 2026 hybrid” was circulated on 10 April 2025. No changes to the agenda were requested, so the draft agenda was adopted.

Review of the SAWG 2025 meeting and progress report

The draft minutes for the 24th meeting of SAWG in 2025, titled “CCQM-SAWG 24th Meeting Draft Minutes_2025-10_V1” were circulated on 23 October 2025. Dr Shard reminded SAWG members that ‘actions’ from SAWG meetings will be stated in the minutes. Nine actions were raised from the 24th meeting and there are no actions outstanding (at the end of this meeting).

Dr Shard implored that all SAWG members register as CMC reviewers in the KCDB. There are current only four CMC reviewers in SAWG.

Progress Report

Dr Shard then reported on the progress of five main activities of SAWG.

SAWG Activity #1: CCQM-K166/CCQM-P210; Measurement of nanoparticle number concentration in liquid suspension (joint with IAWG, led by LGC, UK)

SAWG Activity #2: CCQM-P248; Measurement of mole fractions in Pt_xNi_{1-x} alloy films (led by KRISS, South Korea).

SAWG Activity #3: CCQM-K136.2025 and P243; Measurement of porosity properties of nanoporous silica (led by TÜBİTAK UME, Türkiye)

SAWG Activity #4: CCQM-P230; Measurement of surface elemental mole fractions in ionic liquids (led by BAM, Germany)

SAWG Activity #5: CCQM-P259; Measurement of surface amine groups on silica nanoparticles, joint with OAWG (led by BAM, Germany).

Task Groups: The joint IAWG-SAWG TG on nanoparticles has concluded its work. A final report has been produced and a summary report given at the April 2026 meeting. A roadmap for IAWG/SAWG activities has been produced, important measurands identified and, given the overlapping nature of these measurands, and the need for strong stakeholder engagement, it is suggested that a particle metrology task group be initiated at the CCQM level.

The SAWG Raman TG continues its work to identify suitable pilot studies for SAWG and has liaisons with the CCQM TG on micro and nanoplastics.

A new SAWG TG on 2D materials has been initiated, chaired by Dr Hight-Walker. The terms of reference have been defined and the first virtual meeting of the task group was held on 12 February 2026.

SAWG Representation

Dr Shard then commented on the representation of SAWG in other TGs and WGs across CCQM. The current representatives are shown in the table below.

Group	Main SAWG representative
Strategic Planning Working Group	Alex Shard
Key Comparison Working Group	Rainer Stosch
<i>ad hoc</i> Working Group on the Mole	Alex Shard
Task Group on Food Measurement	Andrea Mario Rossi
Task Group for Gene Delivery Systems*	Caterina Minelli
Task Group on Micro and Nanoplastics	Åsa Jämting

An overview of past comparisons was shown, split by broad groups of measurands, e.g. thin film composition, thin film amount, imaging and mapping, SSA, nanoparticles. An overview of future and possible comparisons was also shown.

- Dr Minelli commeted a comparison including both nanoparticle with Raman area would be nice, and Dr Shard agreed. Dr Minelli also said that the imaging area is very focused around Raman but there are other imaging techniques. Dr Shard said there are no suggestions yet for XPS or XRF imaging, but there are people doing SEM and EDX (namely Dr Vasile-Dan Hodoroba, BAM).
- Dr Radnik added that XPS imaging is important for manufacturers but unsure how useful in the community. Dr Shard also suggested Dr Ken Mingard, NPL for SEM and EDX. Dr Shard asked SAWG members to reach out to colleagues and gauge interest.

Introduction of SAWG attendees

SAWG contact persons have access to all restricted documents concerning past and upcoming meetings.

Participants of this meeting have access to the documents related to this meeting only if they are registered in the BIPM database. Participants (both in-person and online) were invited to provide a short introduction of themselves and their activities / techniques that are within the scope of SAWG.

Brief report of the KCWG meeting

R. Stosch (PTB)

One CMC submitted for JCRM review for SAWG in 2025-2026 period (Cycle XXVIII).

Dr Stosch gave an update of activities in the Key Comparison Working Group, KCWG. He gave an overview of the membership of the KCWG, its terms of reference, the CIPM MRA mechanisms, and briefly explained the CMC review process (intra- and inter-RMO (JCRB) review).

The agenda of the CCQM KCWG 2026 meeting was shown. The first presentation was regarding updates on JCRB matters (by Kazuaki Yamazawa) and topics included: comparison older than 5 years and what causes delays, CMC review and further processes, and the “validity” of CMCs on the KCDB. Dr Stosch explained what “hanging CMCs” are (i.e. CMC submission remaining in JCRB Revision Requested for over 6 months) and they can be prevented with sufficient communication between CMC submitters and reviewers. He showed reasons why hanging CMCs occur. Currently 145 CMCs are hanging. Dr Stosch informed SAWG of the Capacity Building and Knowledge Transfer (CBKT) programme. Training is frequent announced with online webinars, technical exchanges, and YouTube videos.

- Dr Shard commented that the K166 Nanoparticle number concentration in liquid suspension will end up on the 5-year-old KC list soon (“naughty” list).

The second presentation at the KCWG meeting was an update on KCDB matter (by Stéphanie Maniguet). There have been improvements to the KCDB user interface (viewing and reviewing CMCs). CIPM MRA comparison reports moving to BIPM.org and reported will now have their own DOI like a normal publication. The KCDB API for CMC research has been updated. Examples of non-KC evidence for CMC claims given (as discussed by OAWG). Automation of CMC re-review was discussed. Also, discussion on amount-of-substance categories and quantities in chemical metrology – analyte, quantity, matrix.

- Dr Shard comment that Robert Wielgosz has said that all CMCs will be searchable by API / AI so sub-categories may become obsolete. Dr Shard says the current KCDB search function does not work very well to find SAWG CMCs. Continued discussion between Dr Stosch and Dr Shard.

Dr Stosch also updated SAWG on the KCWG TG on tools for CMC review (of which Dr Stosch is a member, stating their draft terms of reference. Their activities will start in May/June 2026. Dr Stosch also discussed CMC re-review strategies from IAWG and how SAWG addresses its re-review strategy.

- Dr Shard and Dr Stosch agreed to write proposal for SAWG CMC re-review strategy and circulate that before September 2026, to then discuss at the interim meeting.
- Dr Shard also commented that SAWG should have a strategy to what evidence SAWG will accept or consider CMC claims, and took an action to do so.
- Dr Shard thanked Dr Stosch for representing SAWG on the KCWG.

Update on P230: Elemental composition of an ionic liquid surface

J. Radnik (BAM)

Dr Radnik gave an update on ongoing P230 on elemental composition of an ionic liquid surface. A copy of Dr Radnik's slides will be available in the SAWG documents. The pilot included three ionic liquid samples (containing C, N, O, F, P, and S). The measurands of this pilot study are the mole fractions of elements (excluding hydrogen) of three ionic liquids expressed in atomic percent (at.%, or cmol/mol). The protocol was circulated in summer 2025; the samples were circulated in November 2025. Some participants have returned results, mainly XPS and EDS. Dr Radnik showed some initial (and anonymised) results. In general, sample B (or 2) exhibited a carbon enrichment with XPS. Less problems with fluorine containing sample compared to phosphorus containing sample (i.e. Arsenic contamination was observed in some lab's results, not all, in the phosphorus containing sample, less than 0.5at%). Crust formation was observed with SEM but exhibited dissolution under e-beam so there are dynamic behaviours. Dr Radnik stressed that homogeneity checks and visible checks are necessary because ionic liquid films that are too thin lead to wrong results. The pilot study is ongoing.

- Mr Jordaan said that NMISA never received the ionic liquid samples. Dr Windover explained that they have results from one NIST colleague, but another NIST colleague didn't receive samples. Dr Radnik, Mr Jordaan, and Dr Windover to resolve.
- Dr Shard asked that a deadline was set for return of P230 results. Dr Radnik suggested 31st August 2026.

Dr Krumrey also presented P230 results from PTB on reference-free XRF analysis because it differs from other techniques. Measurements were taken at two different beamlines at BESSY II. Special holder of liquids included a 30 nm silicon nitride window. Homogeneity observed in the 1 mm by 1 mm window by measuring sulfur signal, transmission of silicon nitride window was also considered as well as the nitrogen contribution from the window (which gives a higher uncertainty of nitrogen quantification). Dr Krumrey showed the XRF spectra acquired in P230 but (as requested by Dr Radnik and Dr Shard) did not show quantification results.

Update on K-136.2025 and P243: Measurement of porosity properties of nanoporous silica

A. E. Sadak (TÜBİTAK UME)

Dr Ali Enis Sadak (TUBITAK, Republic of Türkiye) gave an update regarding K-136.2025 and P243 on the measurement of porosity properties of nanoporous silicon dioxide. A copy of Dr Sadak's slides will be available in the SAWG documents. Homogeneity and stability results for the comparison material (nanoporous silicon oxide) were shown. Five NMIs have reported results before the revised October 2025 deadline (NPL could not submit results due to instrument failure). The adaptive weighted mean was selected as the KCRV for all measurand following the CCQM guidance note. at different P/P₀ regimes. Specific adsorption results were then shown for different P/P₀ regimes: strong consistency in 1×10^{-2} and higher P/P₀ regime, less consistency at lower P/P₀ regimes. BJH adsorption average pore width show consistent results across NMIs. Overall good agreement; all five NMIs received positive equivalence verdicts ("+") across all twelve measurands. No outliers were detected by the median-based outlier test. The KC's "How far the light shines" statement was given.

- Dr Shard asked about the circulation of the reports for K-136:2025. Dr Sadak confirmed that Draft A would be circulated at the end of April 2026, and Draft B by end of August 2026.
- Dr Sobina expressed doubt that this comparison can be used to declare micropore substances in the "How Far the Light Shines Statement" and suggested changing it to mesopores. Dr Sadak agreed and made the change.
- Dr Shard congratulated Dr Sadak on running a successful KC.

Update of the Raman Task Group

L.-L. Tay (NRC)

Dr Li-Lin Tay (NRC) presented a report on the Raman TG activities, namely the Raman measurement related activities within VAMAS TWA 41 and 42 as well as the various activities from the ad-hoc international Raman metrology group. A copy of Dr Tay's slides will be available in the SAWG documents. Dr Tay spoke about the CHARISMA project which is soon coming to an end and gave an update on activities:

- #1 Protocols for Raman Instrument Calibration and Harmonization of Raman Data
- #2 Protocol for Relative Intensity Calibration of Raman Spectrometers: still in development stage.
- #3 Joint Project 42-8 and 46-3 Standardising Lattice Strain Measurement in Semiconductor Substrates using Raman Spectroscopy. Dr Stosch stepped in to give a quick update: almost finished collection of participants results, 14-15 in total, second study planned with polarised Raman light.
- #4 Variability in Coherent Raman Scattering (CRS) Microscopy Peak Position led by NPL: Technical lead on paternity leave, but no concerns in getting participants, but there have been few updates
- #5 Wavenumber Validation of Raman Spectrometers: call for participants just closed, still going through protocol validation.
- #6 Measurement of Lateral resolution of Raman Microscopy with Nanowire Artefacts, led by NPL: paper has been published recently, lessons learnt from round robin include last participants found wires were degraded or contaminated when they received them.

Dr Tay asked SAWG members to contact Dr Hight-Walker if interested in joining the Raman metrology standardisation activities.

- Dr Shard commented that a lot of the activities in VAMAS are dedicated to dimensional, or intensity, or wavenumber measurement, and asked about quantitative Raman studies. Dr Tay responded that there are proposals in line with SAWG being considered, e.g. group from Xiamen University group interested in quantitative surface-enhanced Raman (but complicated protocol, could be multiple studies, discussion ongoing on how to split into smaller studies).
- Dr Tay also commented there's a lack of a structural way of determining which studies are required by the community. Dr Shard asked can the TG in SAWG provide guidance in VAMAS, and comment that would be nice to put some chemical measurands on the agenda.
- Dr Hight-Walker added that broadening what is SAWG appropriate would help. Dr Tay and Dr Shard agreed. Dr Shard comment that there is a preliminary agreement to look at vacancies as a measurand, which opens up the door to defected graphene quantification with Raman.

Progress on Raman pilot study

L.-L. Tay (NRC)

Dr Li-Lin Tay (NRC) presented a proposal for a pilot study using Raman spectroscopy called "Relative Mass Fraction of Miscible Polymer Thin Films". No pilot study number has been issued yet. Dr Shard will get the pilot study number as soon as Dr Tay is ready to move ahead with the study. A copy of Dr Tay's slides will be available in the SAWG documents. Dr Tay gave a recap of the idea behind the study, the protocol, the removal residual solvent in PPO and PS films, the long-term stability of the sample, and homogeneity analysis of the thin films to assess phase separation. Sample stability assessment was made too. Smaller thicker samples to help this and reduce glass substrate contribution. Test samples were sent to four NMIs for more sample shipping tests, and Dr Tay confirmed they are happy to send out more if NMIs want to contribute. Dr Tay felt that Pilot study is ready to go and opened the floor to discussion.

- Dr Shard asked Dr Tay to PPO/PS ratio for each pixel to allow for quantitative, and Dr Tay agreed to do this. Dr Hight-Walker asked about voids in the Raman imaging data, and Dr Tay confirmed that these are just low intensity regions and there is still substance present.

- Dr Shard reiterated that a draft protocol is needed soon for NMIs to determine whether they want to participate, and then he will get a pilot study number. He also asked whether other techniques will be considered.
- Dr Radnik agreed that XPS would be interesting with sputter depth profiling to avoid surface segregation and contamination. Dr Reed pointed out that an assessment of the polymer degradation index with XPS would need to be assessed and pure materials would need to be provided.
- Dr Shard also questioned the purity of the materials, not required for the pilot study but certainly for the KC. He also suggested a VAMAS study in parallel, and Dr Tay agreed depending on sample bandwidth within NRC.

Nano and microplastics task group CCQM TG-NMMS

Å. Jämting (NMIA)

Dr Åsa Jämting (NMIA) presented an update of the Nano and Microplastic TG CCQM-TG-NMMS. In April 2026, the CCQM-TG-NMMS was granted a one-year extension to prepare material for a pilot Study. Now, the proposal for the pilot study is ready to be presented to the CCQM. In February 2025, the community was surveyed: results stated that CRMs are needed as well as standardisation protocols. But it was not clear what measurands people want (size, mass fraction, concentration, density etc). They were further asked whether they would be interested and able to participate in a pilot study on the determination of Particle concentration (number and/or mass) in microplastic reference materials in the absence of a complex matrix (approximate size ranges 20-50 um and 60-300um respectively. Positive response to both, so Dr Jämting has put a proposal to CCQM for a pilot study and gave details for an expression of interest to SAWG.

- Dr Minelli asked what type of concentration for these samples? Dr Jämting stated the pilot study will be run in parallel with the VAMAS study using JRC's test material. Dr Shard then who will be leading the pilot study? Dr Jämting confirmed NMIA to lead if proposal gets over the line.
- Dr Rossi asked what techniques will be used for nanoplastics in the pilot study. Dr Jämting stated that participants will determine technique but suggest DLS would be nice in combination with other techniques.
- Dr Tay asked whether the pilot study samples are in absence of a complex matrix, so in water? Dr Jämting confirmed this (i.e. water and maybe additional salt) stating no one is willing to step into more complex matrix space.
- There was a discussion between Dr Minelli, Dr Hight-Walker, and Dr Jämting regarding Raman measurements. Dr Jämting confirmed that RMs be sent put to validate techniques.

Microplastics in drinking water, ISO 19015

A. M. Rossi (INRIM)

Dr Andrea Mario Rossi gave an overview on ISO standards addressing microplastics in water (e.g. ISO 24187:2023 and ISO/TR 21960:2020). A copy of Dr Rossi's slides will be available in the SAWG documents. Dr Rossi also presented an overview of the ISO 16094-2 standard for analysis of microplastics in water (published in September 2025) and the ILC trial for validating the standard. Samples created by NIVA, JRC, and BAM for the ILC. Dr Rossi presented the results of this ILC to SAWG. Results confirmed the method's applicability. For the first time test/reference materials (ISO-A, ISO-B, ISO-C), designed to represent different polymer types, particle sizes, and particle number concentrations from three different suppliers were analysed. For particles >50 um, microRaman and microFTIR yielded comparable performance, enabling combined data analysis to improve statistical robustness. Repeatability ranged from 20 % to 45 %. Reproducibility varied with material type and size class, with higher variance observed for smaller particles. The percentage of outliers were < 20%. Results included in Annex G of the standard. Submission to a peer-reviewed journal forthcoming

- Discussion between Dr Shard, Dr Minelli, and Dr Rossi regarding filtration methods and particle analysis techniques.

Progress toward KC: Quantitative analysis of alloy films

S. M. Lee (KRISS)

Dr Seung Mi Lee gave an update regarding the P248 study and preparation for a KC. A copy of Dr Lee's slides will be available in the SAWG documents. Dr Lee recapped the history of the P248 study from April 2023 to April 2026. Dr Lee circulated an updated report draft with updated reference values using combined RBS and ICP-MS measurements. For P248, there were 8 labs from 7 countries. NMIJ could not submit their measurement data due to Japan's export control regulation in 2024. Dr Lee is ready to proceed to KC "Qualitative analysis of PtNi alloy film" using the same objectives and measurand as Pilot study, to include five reference films and three test specimens with unknown composition. The work schedule of the KC was provided (July 2026: Reference values from ID ICP-MS; August 2026: sample delivery with protocol; April 2027: progress report of KC to CCQM-SAWG; and October 2027: finalize report.

- Dr Radnik suggested that HAXPES is included to which there was much agreement. However, MNIs can only report results from one technique in KCs. There was extended discussion on this point suggested running a parallel pilot study. Dr Shard will talk to Dr Wielgosz about this. The HFTLS statement would need to be very clear what techniques apply to which circumstance. Dr Hight-Walker asked how to capture all the information that doesn't end up in the KC final report. Dr Shard says there are no objections to publishing results of studies.

Report on P244: Lipid nanoparticles with encapsulated RNA

T. Cleveland (NIST)

Dr Thomas Cleveland gave an update about P244 Lipid nanoparticle with encapsulated RNA. A copy of Dr Cleveland's slides will be available in the SAWG documents. He gave a summary of participating labs, timeline, and a count of technique/measurands. He also gave an overview of LNPs, how they work and what they look like. Measurands included RNA copy number concentration, RNA encapsulation efficiency, particle diameter distribution, particle number concentration, and a list of example methods. It was expected that individual participants may choose not to report values for all measurands but would select a subset. The microfluidic preparation of LNPs was shown and how diameter and encapsulation efficiency is affected by flow rate. Cryoprotectant studies undertaken – glycerol used for shipping stability. PDI (poly dispersity) and diameter results shown. Nanoparticle tracking analysis shown. Other parameters were checked, including possible effect of temperature on particle diameter measurement. Diameter by other scattering techniques was also shown.

Update on P259: Quantification of surface functionalities on nanoparticles

J. Radnik (BAM)

Dr Jorg Radnik provided an update about SMURFNano and planned SAWG activity. A copy of Dr Radnik's slides will be available in the SAWG documents. Dr Radnik gave an introduction about the SMURFNano project, whose objective is to generate traceable reference methods, reference data, and reference materials for surface analysis of industrially relevant functional nanoparticles.

ILC protocols have been developed in several steps through several studies which were discussed at length. Homogeneity and stability studies for aminated silica NPs conducted in recent months. The timeline for CCQM P259 study was shown, with samples to be sent out in May 2026 and expecting results by Autumn 2026. Announcement of an event: Workshop@ Evonik qNMR: Quantification of surface modifications on advanced Nanomaterials, 30th June and 1st July

- Dr Shard asked about interest from SAWG members for the pilot study.: Dr Radnik confirmed about 8 or 9. XPS participants. Dr Shard commented that this needs to be confirmed
- Dr Shard asked whether the measurand N/Si ratio assuming homogeneous samples. Dr Radnik confirmed.

- Dr Tay wanted clarification regarding the techniques for P259. Dr Radnik confirmed that both qNMR and XPS, but only the qNMR study is currently running, with XPS to come later.

IAWG/SAWG TG on nanoparticles, final report

Caterina Minelli (NPL)

Dr Minelli (NPL) presented a final update for the nanoparticle metrology TG within the IAWG and SAWG. A copy of Dr Minelli's slides will be available in the SAWG documents. A reminder of the terms of reference was given: Examine the outcomes of the CCQM Workshop on Particle Metrology held 25-27 October 2022. Liaise with external stakeholders to understand better the important needs and gaps in particle metrology that can be addressed by the IAWG and SAWG. Liaise with the CCL-WG-N to leverage knowledge and identify opportunities for cooperation between (nano)dimensional, chemical and biological activities with respect to particle metrology, and provide a written report. Connections to many other WGs and TGs in CCQM shown. The main drivers of this work include industrial innovation; regulatory compliance; human and environmental health; resilience and sustainability. Current state of the art shown showing interest beyond IAWG and SAWG, with particles increasing in complexity and size ranges. Several gaps were identified, mainly reference materials, measurands, and methods for real word particles, and metrology infrastructure supporting a sustainable shift. Examples shown, such a liposomal formulations and AAVs. In the report, a map of measurands was provided plotting particle types against the measurand and assessing their difficulty/feasibility. The report proposes a practical roadmap for the next 10 years. Relevant to SAWG particle functionalities. Other recommendations were provided: New measurands, new TG under CCQM, and improved industry participation.

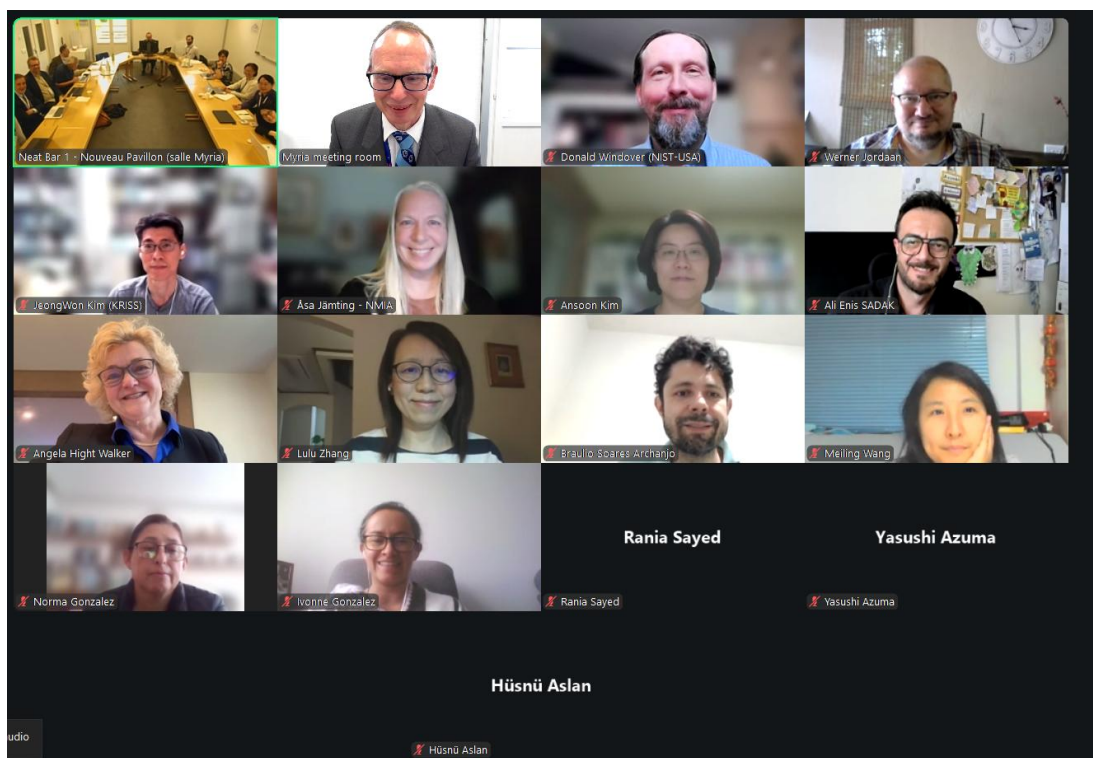
- Dr Radnik asked is there any exchange between CCQM and OECD regarding regulation. Dr Minelli answered there are some links, but only bottom-up (scientists), not top-down, but it would be good to forge these links. Dr Shard suggested a high level liaison between CCQM and OECD is needed.

SAWG group photo

The in-person participants convened in the BIPM garden for a group photograph, which is shown below. An online participants' photograph was also taken via screen capture which is shown below.



From left to right: Dr Benjamin Reed, Dr Egor Sobina, Dr Caterina Minelli (front), Dr Andrea Rossi (back), Dr Li-Lin Tay (front), Dr Michael Krumrey (back), Dr Seung Mi Lee (front), Dr Alexander Shard (back), Dr Kazuhiro Kumagai, Dr Yaxuan Yao, Dr Rainer Stosch, and Dr Jörg Radnik.



Update on the 2D materials Task Group

Angela Hight Walker (NIST)

Dr Angela Hight-Walker gave an update on the TG for 2D materials. A copy of Dr Hight-Walker's slides will be available in the SAWG documents. The justification and motivation for the TG were presented, and the terms of reference for the SAWG TG on 2D materials was shown. Dr Hight-Walker still looking for participants for the TG from SAWG. CCEM TG of QHR standards. The aim of the task group is to identify activities that SAWG should undertake to develop and improve chemical metrology for 2D materials. This includes engagement with stakeholders in industry (e.g. CHIP (INTEL, TSMC, Micron, ASML, National, Texas Instruments), research centres (GEIC, IMEC, CEA, SRC?, NY Creates, BGI China), and NMIs. Large list of manufacturers provided too (e.g. Applied Materials, Danish Graphene, Haydale, Blackswan, etc.). Plan to reach out to stakeholder for the identification of measurands and the identification of cooperative research activities, pilot studies and key comparisons.

Discussion Topic: can we claim CMCs for instrument calibration?

Alex Shard (NPL)

Dr Alex Shard requested this discussion session to explore CMC claims and instrument calibration and specifically what evidence would be acceptable for CMC claims beyond key comparisons. Contributions from Yaxuan Yao (NIM), Li-Lin Tay (NRC), Benjamin Reed (NPL) and Michael Krumrey (PTB). A copy of the contributors' slides will be available in the SAWG documents. The following discussion explored whether instrument calibration could be claimed as a CMC and what types of evidence would be acceptable, particularly in the absence of key comparisons. The idea of doing more pilot studies instead of KCs was considered although claiming CMCs from pilot studies is often discouraged. Dr Shard and Dr Tay will draft a strategy document on acceptable evidence for CMC claims and develop a strategy for what evidence SAWG will accept for CMC claims without key comparisons, including pilot studies, peer-reviewed publications, and bilateral comparisons and circulate among SAWG members by September 2026.

AOB and Close

Dr Shard asked if there was any other business.

Dr Shard asked this meeting's speaker to send their slides to him or upload them to the SAWG SharePoint site.

Dr Shard will organize an interim virtual meeting for SAWG (like last year) in September or October 2024, before October 1st or 15-30 days after October 1st to accommodate potential US government shutdown.

The members of SAWG congratulated Dr Michael Krumrey on his upcoming retirement, thanked him for his considerable efforts toward SAWG activities, and wished him well for the future.

No more AOB was brought forward by participants. Dr Shard thanked all participants for their attendance and input and closed the 25th CCQM-SAWG meeting.