



International Union of Pure and Applied Chemistry

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Analytical Chemistry Division (V): Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories

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To:
IUPAC Secretariat
Dr. John Jost
Executive Director

Subject: **Report on participation at the CCQM (BIPM) meeting, 4 - 7 April 2000, Sevres, Paris, France***

As the IUPAC representative I attended the 2000 annual meeting of the Consultative Committee on Amount of Substance (CCQM) at the BIPM Headquarters in Sevres, France, between 4 and 7 April 2000.

The points discussed at this meeting included: mutual recognition arrangement, structure of the information data base on the CCQM key-comparisons, reports from the working groups, discussion on biometrology, etc. The most important part of the meeting was a symposium on 'Primary Methods of Analysis'. CCQM is the highest metrological body on metrology in chemistry and within this authority the following methods have so far been identified as being potentially primary: gravimetry, coulometry, titrimetry and isotope dilution mass spectrometry.

Already for some time it has been recognised that a method *per se* is not enough to deliver results expected for primary methods – the results with the smallest possible measurement uncertainty and direct traceability to the basic units of the International System of Units (SI). A combination: matrix, analyte, method, analyst is the one that defines what level of traceability and uncertainty can be achieved in practice. In this sense it was the aim of the symposium to investigate various other analytical methods in respect to their potential of being primary methods of analysis. The following methods were presented:

- coulometry for purity determinations,
- differential scanning calorimetry for purity determination,
- integrated instrumental method for purity determination,
- titrimetric determination of copper in an elemental solution,
- gravimetric analysis of sodium in serum,
- ID-GC/MS for clinical diagnostic markers,
- ID-ICP-MS for trace elements in natural waters,
- INAA for arsenic in semiconductor materials,
- ICP-OES for major elements in a high temperature alloy,
- cavity ring down spectroscopy for gas purity measurements, and
- absolute isotopic ratio measurements for determining amount of substance.

* Please note that at the time of preparation of this report, there was no official report (minutes) of the CCQM (BIPM) issued. All statements given in this report reflect author's opinion only.

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A required scope for all presentations was: underlying principle(s) of methodology, basis for being primary method (in principle and in practice), critical review of best practices, scope of applicability (limits and boundary conditions), and example(s) with quantified measurement uncertainty.

However, there was no instant conclusion at the meeting to declare one or the other method as having a primary characteristics. Apparently, the very high quality of most of the presentations and examples provided put the Committee in a regrettable but not insoluble situation. For this reason it is hardly to expect that additional methods will soon be added to the list of primary methods, although it was recognised that some of the methods may produce the results of the highest metrological quality. A shared opinion at the CCQM after the presentations was that rather than declaring methods of being primary, one should see if the methods applied and the results obtained (traceability, measurement uncertainty) are really 'fit for purpose'. Therefore, a traditional distinction between 'primary' and 'other' methods of analysis does not play such an important role as the use of validated methods that are 'fit for their intended use'.

Per definition, the primary methods are being applied for the production of primary reference materials. For this reason, the above-mentioned change in the perception of analytical methods has a very strong influence on the characterisation and certification of reference materials. It has immediately been reflected at the last meeting of the ISO Committee on Reference Materials (ISO REMCO), specifically in the preparation of a new ISO Guide 35 'Certification of reference materials – general and statistical principles'. A separate travel report was prepared on my participation at this meeting, which took place between 15 and 17 May 2000 in Geneva, Switzerland.

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