

IUPAC DIVISION V ANALYTICAL CHEMISTRY ACTIVITIES AND PLANS 2021-2023

Strategic Focus of Division V

Analytical chemistry is concerned with all aspects of the chemical measurement process. This includes the application of metrology (the science of measurement) to chemistry, the development and application of methods and techniques for chemical analysis, the critical evaluation of chemical data produced by analysis, and FAIR communication of the results of work in these areas to chemists and non-chemists. This broad concern with chemical measurement leads to collaboration with numerous other IUPAC bodies, as shown by examples outlined in this poster. Further information about activities described here can be found through use of the QR codes, from the Division V webpage or by contacting the Division President, David Shaw at dgshaw@alaska.edu.

In all our work, Division V is guided by our Terms of Reference, which articulate our mission, goals and objectives in the context of IUPAC's strategic plan.



Awards in Analytical Chemistry

In line with Division V Terms of Reference, to “support the development and recognition of analytical chemistry as a discipline”, in 2020, Division V established two awards honoring excellence in analytical chemistry. The IUPAC Analytical Chemistry Medal honors significant lifetime contributions to the aims of the Analytical Chemistry Division of IUPAC and the Emerging Innovator Award in Analytical Chemistry recognizes outstanding work undertaken by an emerging analytical scientist that corresponds to the aims of the Analytical Chemistry Division of IUPAC. These awards recognize outstanding analytical chemists and associate IUPAC with scientific excellence in the minds of our stakeholders. They are conferred and award lectures are presented during General Assemblies.

In 2021 Joseph Wang, Distinguished Professor of Nanoengineering, University of California San Diego received the Analytical Chemistry Medal and delivered a lecture, “Electrochemical Sensors: From Beakers to the Skin and the Mouth” and Tsuyoshi Minami, Assistant Professor, Tokyo University, received the Emerging Innovator Award and delivered a lecture “Supramolecular Analytical Devices: Toward On-Site Analysis in Real-World Scenarios”.

In 2023 Janusz Pawliszyn, Canada Research Chair Professor, University of Waterloo received the IUPAC Analytical Chemistry Medal and delivered a lecture “Significance of Fundamentals in Development and Optimization of Sustainable Sampling and Sample Preparation Technologies” and Xin Yan, Assistant Professor, Texas A and M University received the Emerging Innovator Award in Analytical Chemistry and delivered a lecture “Microdroplet Mass Spectrometry for Lipid Isomer Analysis and Accelerated Discovery of Transition Metal Catalysis”.



J. Wang



T. Minami



J. Pawliszyn



X. Yan

Joint Projects and Activities with Other IUPAC Bodies and Beyond

Because the focus of Division V includes all aspects of the chemical measurement process, its joint activities are extensive – 23 current projects with six other divisions and two committees. In addition, Division V through its Subcommittee on Metrology in Chemistry and Interdivisional Subcommittee on Critical Evaluation of Chemical Data (discussed elsewhere on this poster) work jointly with other bodies.



Development of tools producing FAIR and machine-readable data with CPCDS

Aspects of chemical measurements with Division VI



Aspects of isotope ratio measurements with Division II

Review of the status of analytical chemistry education with CCE



Joint activities of the SMiC

All current projects of Division V



Evaluation of Chemical Data

The application of chemical analysis produces many kinds of data which are used by chemists, health scientists, engineers and others who may be unfamiliar with the procedures used to obtain the data they rely on. Several IUPAC Divisions have ongoing data evaluation programs to assist data users in assessing the quality of the data they use. In line with our Terms of Reference, to “provide the highest level of unbiased analytical chemical science expertise” the Subcommittee on Solubility and Equilibrium Data of Division V continues an effort going back to the 1950s of compiling and evaluating data for stability constants and solubilities of chemical substances.

The Solubility Data Project, since publishing its first volume in 1979, has produced 105 volumes of compilation and evaluation of solubilities. Volumes covering selected solubility systems of gases in liquids, liquids in liquids and solids in liquids are included.



Starting in 1977 the Stability Constants Project has produced 27 works of compilation and evaluation of selected stability constants in aqueous and non-aqueous systems. Earlier work begun in 1957 produced 10 works of compilations of published values.



In 2017 Division V took the lead in forming the Interdivisional Subcommittee on Critical Evaluation of Data which, with participation from Divisions I, II, IV and CPCDS, is a forum for exchange of information among IUPAC bodies active in data evaluation. The ISCED is preparing Technical Reports giving guidance to various aspects of data evaluation.

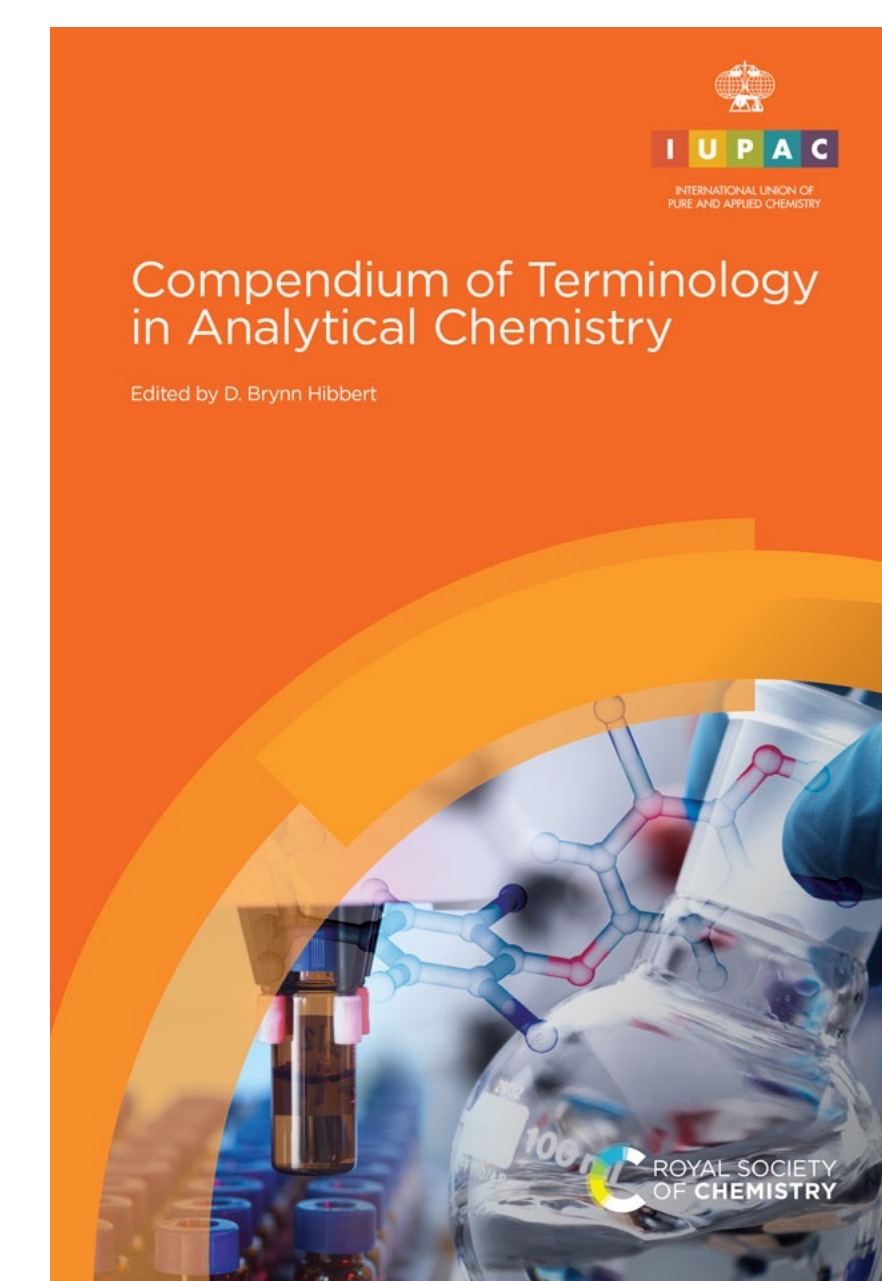


Publication of the Orange Book

January 2023 saw the publication of the fourth edition of the *Orange Book*, the Compendium of Terminology in Analytical Chemistry. This marked the completion of more than a decade's work to review, revise and expand IUPAC-Recommended terminology in analytical chemistry. With more than 50 contributors led by Scientific Editor D. Brynn Hibbert, the work contains 13 chapters each covering a specific aspect of analytical chemistry and is based on 11 new Recommendations and two new Technical Reports all published in *PAC* between 2013 and 2021.



But the work of making IUPAC-Recommended terms in analytical chemistry accessible to the global chemistry community is by no means complete. Work is now in progress to incorporate the 3000+ terms of the *Orange Book* into the on-line version of the Compendium of Chemical Terminology, the *Gold Book*. Division V is working in concert with CPCDS and ICTNS to ensure the material in the *Gold Book* is faithful in every detail to the originally published Recommendations and that all cross-reference links are correct and functional.



It is by no means certain that a future fifth edition of the *Orange Book* will be published in paper form. Digital communication has expanded so greatly since work on the fourth edition began in 2008 that future Recommendations published in *PAC* are likely to be considered as they appear for inclusion in the *Gold Book*. With this in mind, Division V is already discussing updates to some of earliest-completed topics that form the basis of the new *Orange Book*.

Engagement with New Members

While Division V is fortunate in having a core of highly engaged members, we are always seeking renewal and diversity by attracting new participants to our Division Committee, subcommittees and projects. In 2022 we provided nominees for positions on the Division Committee with fuller information about our work and requested a statement of expected contributions (a request implemented for all bodies by the Secretariat). We think that these steps have improved our selection process.

We have also increased our engagement with IUPAC's Young Observer Program. In 2021 the ACD worked to connect with individuals who had been selected for the YO program and was successful in maintaining engagement with a group whose members have joined existing projects and proposals, initiated two new projects and formed Division V's new Early-Mid Career Scientists Subcommittee. During our meeting during the 2023 General Assembly, we scheduled an agenda item to engage with YOs. This allowed YOs to interact with current members to learn about opportunities for participation in ongoing projects. In the coming biennium we will work to coordinate between our new subcommittee and the International Younger Chemists Network.