



INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS)
Report by Prof. Jürgen Stohner

Executive Summary dated 7 January 2025

This report extends and completes ICTNS proceedings until end of 2023 extending the summary provided to the IUPAC Council in The Hague 2023.

During the period 01 Jan 2019 to 31 Dec 2023, ICTNS continued its activities on behalf of IUPAC. It has reviewed, edited and approved for publication (59) Recommendations and Technical Reports in Pure and Applied Chemistry (PAC) for a total of (1709) journal pages (Table 1). The activities of ICTNS are summarized in the two tables within the Appendix below. Information is complete for PAC volumes 95, the January to December 2023 issues.

ICTNS carried out editing for the completed projects that culminated in 14 books that include a Colour Books, *viz.* the Silver Book Compendium of Terminology and Nomenclature of Properties of Clinical Laboratory Sciences. All books bear the label of IUPAC. The total book pages edited to ensure adherence to IUPAC requirements numbers 6,240 since 2015. No book was edited from 2020 until today.

The ICTNS continued its consultation and advisory work with several international societies and agencies on which ICTNS has representation that include the BIPM. One important issue dealt with during the reporting period with the BIPM concerned the definition of the mole and ancillary matters. The ICTNS was part of the Task Group examining the definition of the mole and way ahead. Manuscripts are with reviewers for PAC. In addition, ICTNS provided the on-going resource for the Secretariat in dealing with queries from scientists, engineers, teachers, students and the general public on terminology, nomenclature, symbols and units.

The Chair acknowledges the members of the ICTNS who have shouldered the heavy workload as described in the detailed Appendix and its extension below. The 2022/23 biennium members of ICTNS are the Secretary Professor D. Brynn Hibbert (Australia); TMs are Dr. Milan Drabik (Slovakia), Professor Jan Kaiser (UK) and Dr. Gerard Moss (UK); the AMs are Dr. Juris Meija (Canada) and Professor Amelia P. Rauter (Portugal); the representatives from the Divisions and other international organisation are Drs. Michael A. Beckett, Jiazhong Chen, Jeremy Frey, Linda Johnston, Pavel Karen, M. Clara F. Magalhaes, Irina Perimona and Amelia P. Rauter.

The Chair also thanks the staff at the Secretariat for their very valuable assistance especially Fabienne Meyers, Cheryl Wurzbacher, Greta Heydenrych, Enid Weatherwax and at De Gruyter publishing Masha Dorogova, Katharina Kaupen and Theresa Haney.

My four-year appointment as Chair ICTNS started on 1 Jan 2022. As volunteers to the work of IUPAC via ICTNS, I appreciate the sacrifices all of you have made and will make to help maintain the IUPAC goal for a common scientific currency in the world. Your reviews have been excellent and your comments have been helpful and important to me in making the decisions. I thank each of you!

Members are reminded of the following motion as Minute 17 passed at the 89th IUPAC Bureau meeting held 17-18 Apr 2010 in Sofia, Bulgaria.

http://old.iupac.org/news/archives/2010/bureau_min_sofia_2010.pdf.

17. REAFFIRMATION OF THE ROLE OF ICTNS

The Chairman of ICTNS, Prof. Weir, submitted a Briefing Note to the Secretary General requesting a statement of continuing support from the IUPAC Bureau or Executive Committee that acknowledges the responsibilities of ICTNS to enforce existing IUPAC Recommendations in publications sponsored by IUPAC and to maintain cooperation with international bodies on which IUPAC is represented. The Briefing Note may be found in the Agenda Book.

Prof. Black discussed the historical implications of this matter and introduced the following Motion: *The Bureau reasserts its strong support for the responsibilities of ICTNS to enforce existing IUPAC Recommendations in publications sponsored by IUPAC and to maintain cooperation with international bodies on which IUPAC is represented.* This motion was seconded by several Bureau members and was unanimously passed without discussion.

1. ICTNS Report, 01 January 2020 to 31 December 2023

1.1 Terms of Reference of ICTNS

These include:

(i) To be responsible for submission to the Board/Council, in accordance with Bylaw 2.11, for publication or otherwise, any IUPAC document concerned with terminology, nomenclature, symbols and other conventions.

(ii) Before recommending any material for publication as an IUPAC document, to ensure that full consultations have taken place, and the widest possible consensus has been reached among all Divisions and other bodies of the Union, and between IUPAC and other ICSU bodies, the international standardizing organizations, and Conférence Générale des Poids et Mesures (CGPM) and its Committees.

(iii) To ensure, via each Division's Titular Member on ICTNS, that all documents for publication emanating from that Division have been subject to a satisfactory level of review of substantive material by the Division Committee.

(iv) To ensure that any considered IUPAC view shall carry the fullest possible weight among other international organizations, all negotiations on matters concerned with nomenclature and symbols with other ICSU bodies, with the international standardizing organizations, and with CGPM and its Committees, shall be conducted through ICTNS, which shall advise relevant bodies accordingly.

(v) To be responsible, after consultation with all relevant bodies of IUPAC, for the official IUPAC comments on all documents on nomenclature, symbols, terminology and conventions sent to the Union for comment.

(vi) To advise the President and relevant bodies on suitable persons for appointment as representatives of IUPAC on other bodies concerned with nomenclature, symbols and terminology.

As a consequence, ICTNS is responsible for editing and approving the content of IUPAC Recommendations and Technical Reports for publication in *Pure and Applied Chemistry*, for approving publication of IUPAC reports in journals other than PAC that include publication of reports that contain new experimental data, for reviewing IUPAC-sponsored books for adherence to IUPAC standards of Terminology, Nomenclature, Symbols and Units, and also for approving, on behalf of IUPAC, publications emanating from international bodies on which IUPAC has representation. Editing of these publications is carried out by the respective organisation.

The ICTNS carries out these tasks by very extensive review processes. For IUPAC Recommendations, a Public Comment Period of about five months is required, with input from members of ICTNS within three months. Both Recommendations and Technical Reports are carefully scrutinized for conformity with IUPAC-approved Terminology, Nomenclature, Symbols and Units, and are also edited carefully for scientific content. For those documents whose source lies with international bodies, ICTNS also carries out careful reviews.

The overall goal from these activities is to continue to enhance the reputation of IUPAC as a source of international standards in chemical terminology and nomenclature through publication of *Pure and Applied Chemistry* and continuing interaction with international organisations.

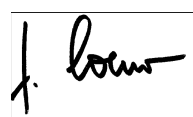
Publication of the on-line Gold Book *IUPAC Compendium on Chemical Terminology* provides an opportunity for nearly continuous update of IUPAC-approved terminology, as well as corrections where required. The ICTNS maintains up-to-date and detailed instructions for the preparation of publication for *Pure and Applied Chemistry* and also acts as a consulting resource for the Secretariat and other IUPAC bodies in answering queries from professionals and students on problems in terminology and nomenclature.

The Terms of Reference require ICTNS to conduct, and advise responsible bodies accordingly, all negotiations concerned with nomenclature, terminology and symbols with other ICSU bodies, with international standardizing organisations, and with CGPM and its committees. This measure ensures that IUPAC views carry the fullest possible weight among other international organisations. In practice, ICTNS maintains contacts with IUPAC representatives on these organisations and also through ICTNS members from the Bureau International des Poids et Mesures (BIPM), International Organisation for Standardization

(ISO), and the International Unions for Biochemistry and Molecular Biology (IUBMB), Crystallography (IUCr), Pharmacology (IUPHAR), and Pure and Applied Physics (IUPAP).

2.0 Changes to Operating Procedures

Nil

A handwritten signature in black ink, appearing to read 'J. Stohner', is positioned above a horizontal line.

Juergen Stohner, Chair

D. Brynn Hibbert, Secretary

PS. Our current achievements and agenda: (1) Guidelines for preparing Technical Reports and Recommendations (revision/update in preparation); (2) Procedure for preparing Gold Book entries and their revisions (ongoing); (3) Joint Subcommittee (CPCDS & IUPAC) to manage the Gold Book content and maintain a high digital standard of the Gold Book online database (ongoing).

APPENDIX

A 1.0 Summary of Publications in *PAC* for the period 01 January 2019 to 31 Dec 2023

The previous biennial reports by Professors J.W. Lorimer and R.D. Weir covered the periods from 01 June 2005 to 30 June 2009 (Lorimer), from 01 July 2009 to 30 June 2011 (Weir), 01 July 2011 to 31 May 2013 (Weir), from 01 June 2013 to 30 June 2015 (Weir), 01 July 2015 to 31 December 2017 (Weir), from 01 January 2018 (Stohner) respectively. In the following summary, the reference number, title, author names, and the project origination follow the entries shown within Manuscript Central.

To assess any trends in the results from work by ICTNS, the statistics for the entire 18-year period June 2005 to 31 December 2023 are summarised in Table 1. Shown are the total numbers of Reports and Recommendations that were processed. These are subdivided by journal pages reviewed for each category. Also shown are the numbers of revised versions of manuscripts that ICTNS processed as a consequence of the review process. Also listed are the total and average number of months elapsed between manuscript submission and publication in *PAC*.

In section 1.1.1 below, there are listed the details of the manuscripts processed for the four-year period 01 January 2020 to 31 December 2023. Included are the titles, authors, *PAC* issue, dates of receipt and publication of each manuscript and the number of revised versions processed. Note that the detailed list of papers published in 2018 and before are excluded to shorten this report since that these details were published previously.

Table 1. Volume of Technical Reports and Recommendations processed by ICTNS

Total Articles

Technical Reports

Recommendations

PAC vol.	Total Articles			Note 1	Note 2	Note 3	Note 4	Technical Reports			Note 1	Note 2	Note 3	Note 4	Recommendations			Note 1	Note 2	Note 3	Note 4
	#	pages pp	avg. pp	# revisions	# mos	avg mospm	avg mospr	#	pages pp	avg. pp	# revisions	# mos	avg mospm	avg mospr	#	pages pp	avg. pp	# revisions	# mos	avg mospm	avg mospr
77 (2005)	12	414	35	-	-	-	-	9	267	30	-	-	-	-	3	147	49	-	-	-	-
78 (2006)	13	354	27	-	-	-	-	8	168	21	-	-	-	-	5	186	37	-	-	-	-
79 (2007)	8	466	58	-	-	-	-	4	135	34	-	-	-	-	4	331	83	-	-	-	-
80 (2008)	12	463	39	-	-	-	-	6	168	28	-	-	-	-	6	295	48	-	-	-	-
81 (2009)	13	455	37	-	-	-	-	10	250	27	-	-	-	-	3	205	68	-	-	-	-
82 (2010)	10	266	27	-	-	-	-	8	170	21	-	-	-	-	2	96	48	-	-	-	-
83 (2011)	20	657	33	39	224	11	6	11	366	33	20	89	8	4	9	291	32	19	135	15	7
84 (2012)	12	450	38	14	100	8	7	7	169	24	9	62	9	7	5	281	56	5	38	8	8
85 (2013)	18	592	33	35	267	15	8	11	293	27	18	131	12	7	7	299	43	17	136	19	8
86 (2014)	16	443	28	21	147	9	7	13	397	31	15	106	8	7	3	46	15	6	41	14	7
87 (2015)	8	140	17	14	60	8	4	5	76	15	11	36	7	3	3	64	21	3	24	8	8
88 (2016)	16	432	27	32	162	10	5	8	162	20	16	77	10	5	8	270	34	16	85	9	5
89 (2017)	4	118	39	6	32	8	5	2	53	27	2	8	4	4	2	65	33	4	24	12	6
90 (2018)	16	826	52	56	293	18	5	11	584	53	34	144	13	4	5	242	48	22	149	29	7
91 (2019)	9	163	18	21	90	10	4	7	120	17	16	62	9	4	2	43	22	5	28	14	6
92 (2020)	15	445	30	39	186	12	5	9	215	24	24	96	11	4	6	230	38	15	90	15	6
93 (2021)	14	437	31	40	291	21	7	9	270	30	29	205	23	7	5	167	33	11	86	17	8
94 (2022)	15	530	35	53	254	17	5	10	198	20	24	111	11	5	6	332	55	29	143	24	5
95 (2023)	6	134	22	25	85	14	3	6	134	22	25	85	14	3	0						

Note 1. Total number of revisions processed by ICTNS. Note 2. Total number of months elapsed between submission date and on line publication in PAC. Note 3. Average number of months elapsed per manuscript. Note 4. Average number of months elapsed per revision.

**Table 2. Books processed by ICTNS for the period
01 January 2016 to 31 December 2023**

Year	Medium	Pages	Pages
2016	Chemistry Beyond Chlorine		599
2016	Successful Drug Discovery Vol II		315
2017	Chemical Issues in Biomass Burning in sub-Saharan Africa		152
2017	Successful Drug Discovery Vol III		605
2017	Glossary of Terms in Reproductive and Developmental Toxicology (Royal Society of Chemistry publisher)		600
2018	Biomass Burning in Sub-Saharan Africa Chemical Issues and Action Outreach (Springer publisher)		167
2018	Glossary of Terms used in Molecular Toxicology		426
2019	Successful Drug Discovery Vol IV (Wiley/VCH publisher)		336
2020	none		
2021	none		
2022	none		
2023	none		
	Σ	1562 (0)	7390 (3200)
	ΣΣ = 8952 pages		

A 1.1 Publications reviewed, edited and approved by ICTNS for publication in *Pure and Applied Chemistry*

Total number of Recommendations (Recs) and Technical Reports (TRs):

Four-year period 01 Jan 13 to 31 Dec 16: Σ Recs + TRs = 58; pages = 1607

Four-year period 01 Jan 14 to 31 Dec 17: Σ Recs + TRs = 44; pages = 1133

Four-year period 01 Jan 15 to 31 Dec 18: Σ Recs + TRs = 44; pages = 1516

Four-year period 01 Jan 16 to 31 Dec 19: Σ Recs + TRs = 45; pages = 1539

Four-year period 01 Jan 17 to 31 Dec 20: Σ Recs + TRs = 44; pages = 1552

Four-year period 01 Jan 18 to 31 Dec 21: Σ Recs + TRs = 54; pages = 1871

Four-year period 01 Jan 19 to 31 Dec 22: Σ Recs + TRs = 53; pages = 1575

Four-year period 01 Jan 20 to 31 Dec 23: Σ Recs + TRs = 51; pages = 1546

A 1.1.1 IUPAC Recommendations for four-year period 01 Jan 2020 to 31 Dec 2023

Total number: 17

Total pages published: 729

PAC-REC-17-10-07 *Nomenclature and terminology for linear lactic acid-based polymers (IUPAC Recommendations 2019)*, Vert, M., Chen, J., Hellwich, K.-H., Hodge, Ph., Nakano, T., Scholz, C., Slomkowski, S., Vohlidal, J. - PAC 92(1), 193-211 (2020), 19 pp.

16 October 2017 - 19 July 2019; 21 months; 3 revisions.

PAC-REC-18-02-05 *Nomenclature for boranes and related species (IUPAC Recommendations 2019)*, Beckett, M., Brellochs, B., Chizhevsky, I., Damhus, T., Hellwich, K.-H., Kennedy, J., Laitinen, R., Powell, W., Rabinovich, D., Viñas, C., Yerin, A. - PAC 92(2), 355-381 (2020), 27 pp.

16 February 2018 - 6 July 2019; 17 months; 3 revisions.

PAC-REC-18-01-09 *Terminology of electrochemical methods of analysis*, Hibbert, D., Pingarron, J., Labuda, J., Barek, J., Brett, C., Camões, M., Fojta, M. - PAC 92(4), 641-694 (2020), 54 pp.

30 January 2018 - 20 May 2019; 15 months; 2 revisions.

PAC-REC-19-04-09 *Definitions and notations relating to tactic polymers*, Moad, G., Fellows, C., Hellwich, K.-H., Meille, S., Nakano, T., Vert, M. - PAC 92(11), 1769-1779 (2020), 19 pp.

17 April 2019 - 21 August 2019; 4 months; 1 revision.

PAC-REC-19-04-04 *Glossary of Methods and Terms used in Surface Chemical Analysis*, Hibbert, D., Takeuchi, T., McQuillan, J., Shard, A., Russell, A. - PAC 92(11), 1781-1860 (2020), 80 pp.

5 April 2019 - 12 May 2020; 13 months; 3 revisions.

PAC-REC-18-12-15 *Terminology of Polymers in Advanced Lithography*, Jones, R. G., Ober, C., Hayakawa, T., Luscombe, C., Stingelin, N. - PAC 92(11), 1861-1891 (2020), 31 pp.

18 December 2018 - 15 July 2020; 20 months; 3 revisions.

PAC-REC-2019-1005 *End-of-line hyphenation of chemical names*, Albert J. Dijkstra, Karl-Heinz Hellwich, Richard M. Hartshorn, Jan Reedijk, Erik Szabo - PAC 93(1), 47-68 (2021), 22 pp.

16 October 2019 - 19 November 2020; 13 months; 1 revision.

PAC-REC- 19-03-02 *Vocabulary of radioanalytical methods*, Zhifang Chai, Amares Chatt, Peter Bode, Jan Kučera, Robert Greenberg, David B. Hibbert - PAC 93(1), 69-111 (2021), 43 pp.

1 March 2019 - 19 November 2020; 20 months; 4 revisions.

PAC-REC- 19-02-03 *Reference materials for phase equilibrium studies. 1. Liquid–liquid equilibria*, Ala Bazyleva, William E. Acree, Robert D. Chirico, Vladimir Diky, Glenn T. Hefter, Johan Jacquemin, Joseph W. Magee, John P. O’Connell, James D. Olson, Ilya Polishuk, Kurt A. G. Schmidt, John M. Shaw, J. P. Martin Trusler, Ronald D. Weir - PAC 93(7), 811-827 (2021), 17 pp.

29 September 2020 – 8 July 2021; 10 months; 1 revision.

PAC-REC- 2020-0103 *Structure-based nomenclature for irregular linear, star, comb, and brush polymers*, Jiazhong Chen, Edward S. Wilks, Alain Fradet, Karl-Heinz Hellwich, Roger C. Hiorns, Tamaki Nakano, Claudio G. dos Santos, Patrick Theato - PAC 93(9), 963-995 (2021), 33 pp.

10 January 2020 – 20 September 2021; 20 months; 2 revisions.

PAC-REC- 2019-0819 *Metrological and quality concepts in analytical chemistry*, David Brynn Hibbert, Ernst-Heiner Korte, Ulf Örnemark - PAC 93(9), 997-1048 (2021), 52 pp.

27 August 2019 – 6 August 2021; 23 months; 3 revisions.

PAC-REC- 2020-0501 *Glossary of terms relating to electronic, photonic and magnetic properties of polymers*, Jiří Vohlídal, Carlos F. O. Graeff, Roger C. Hiorns, Richard G. Jones, Christine Luscombe, François Schué, Natalie Stingelin and Michael G. Walter - PAC 94(1), 15-69 (2022), 55 pp.

11 May 2020 – 18 November 2021; 18 months; 4 revisions.

PAC-REC- 2020-0302 *Henry’s law constants*, Rolf Sander, William E. Acree, Alex De Visscher, Stephen E. Schwartz and Timothy J. Wallington - PAC 94(1), 81-85 (2022), 15 pp.

23 March 2020 – 13 December 2021; 21 months; 5 revisions.

PAC-REC- 18-10-10 *Glossary of terms used in physical organic chemistrys*, Charles L. Perrin, Israel Agranat, Alessandro Bagno, Silvia E. Braslavsky, Pedro Alexandrino Fernandes, Jean-François Gal, Guy C. Lloyd-Jones, Herbert Mayr, Joseph R. Murdoch, Norma Sbarbati Nudelman, Leo Radom, Zvi Rappoport, Marie-Françoise Ruasse, Hans-Ullrich Siehl, Yoshito Takeuchi, Thomas T. Tidwell, Einar Uggerud and Ian H. Williams - PAC 94(4), 353-534 (2022), 182 pp.

16 October 2018 – 23 May 2022; 43 months; 7 revisions.

PAC-REC- 2020-0502 *Terminology and the naming of conjugates based on polymers or other substrates*, Michel Vert, Jiazhong Chen, Andrey Yerin, Karl-Heinz Hellwich, Roger C. Hiorns, Richard Jones, Graeme Moad and Gerard P. Moss - PAC 94(5), 559-571 (2022), 13 pp.

13 May 2020 – 17 March 2022; 22 months; 6 revisions.

PAC-REC- 2020-1211 *Terminology for chain polymerization*, Christopher M. Fellows, Richard G. Jones, Daniel J. Keddie, Christine K. Luscombe, John B. Matson, Krzysztof Matyjaszewski, Jan Merna, Graeme Moad, Tamaki Nakano, Stanislaw Penczek, Gregory T. Russell and Paul D. Topham - PAC 94(9), 1093-1147 (2022), 55 pp.
9 December 2020 – 24 October 2022; 22 months; 5 revisions.

PAC-REC- 2021-0604 *Specification of International Chemical Identifier (InChI) QR codes for linking labels on containers of chemical samples to digital resources* Jeremy G. Frey, Richard M. Hartshorn and Leah R. McEwen - PAC 94(10), 1195-1206 (2022), 12 pp.
5 June 2021 – 18 November 2022; 17 months; 2 revisions.

A 1.1.2 IUPAC Technical Reports for four-year period 01 Jan 2020 to 31 Dec 2023

Total number: 34

Total pages published: 817

PAC-REP-19-01-04 *Brief guide to the nomenclature of organic chemistry*, Hartshorn, R., Hellwich, K.-H., Yerin, A., Damhus, T., Hutton, A. – PAC 92(3), 527-539 (2020), 13 pp.
10 January 2019 – 20 August 2019; 7 months; 2 revisions.

PAC-REP-18-06-02 *A concise guide to polymer nomenclature for authors of papers and reports in polymer science and technology*, Hodge, P., Hellwich, K.-H., Hiorns, R., Jones, R.G., Kahovec, J., Luscombe, C., Purbrick, M., Wilks, E. – PAC 92(5), 793-813 (2020), 21 pp.
18 June 2018 – 27 March 2019; 9 months; 2 revisions.

PAC-REP-2020-2926 *On the discovery of new elements (IUPAC/IUPAP Report)*, Hofmann, S., Dmitriev, S.N., Fahlander, C., Gates, J.M., Roberto, J.B., Sakai, H. – PAC 92(9), 1387-1446 (2020), 60 pp.
24 September 2018 – 4 August 2020; 22 months; 0 revisions.

PAC-REP-2019-0809 *Interlaboratory comparison of humic substances compositional space as measured by Fourier Transform Ion Cyclotron Resonance Mass Spectrometry*, Perminova, I.V., Zherebker, A., Kim, S., Schmitt-Kopplin, P., Spencer, R., Lechtenfeld, O., Podgorski, D., Hertkorn, N., Harir, M., Nurfajrin, N., Koch, B., Nikolaev, E., Shirshin, E., Kats, D., Berezin, S., Rukhovich, G. – PAC 92(9), 1447-1467 (2020), 21 pp.
16 August 2019 – 22 April 2020; 8 months; 2 revisions.

PAC-REP-19-04-05 *Structure, processing and performance of UHMWPE, Part 1: Characterizing molecular weight*, Bucknall, C., Altstädt, V., Auhl, D., Buckley, P., Dijkstra, D., Galeski, A., Gögelein, C., Handge, U.A., He, J., Liu, C.-Y., Michler, G., Piorkowska, E., Slouf, M., Vittorias, I., Wu, J.J., Bucknall, C. – PAC 92(9), 1469-1483 (2020), 15 pp.
6 April 2019 – 20 March 2020; 11 months; 4 revisions.

PAC-REP-19-04-03 *Structure, processing and performance of UHMWPE, Part 2: Crystallinity, entanglement and supra-molecular structure.*, Bucknall, C., Altstädt, V., Auhl, D., Buckley, P., Dijkstra, D., Galeski, A., Gögelein, C., Handge, U.A., He, J., Liu, C.-Y., Michler, G., Piorkowska, E., Slouf, M., Vittorias, I., Wu, J.J. – PAC 92(9), 1485-1501 (2020), 17 pp.

5 April 2019 – 20 March 2020; 11 months; 3 revisions.

PAC-REP-19-04-06 *Structure, processing and performance of UHMWPE, Part 3: Deformation, wear and fracture*, Bucknall, C., Altstädt, V., Auhl, D., Buckley, P., Dijkstra, D., Galeski, A., Gögelein, C., Handge, U.A., He, J., Liu, C.-Y., Michler, G., Piorkowska, E., Slouf, M., Vittorias, I., Wu, J.J. – PAC 92(9), 1503-1519 (2020), 17 pp.

6 April 2019 – 20 March 2020; 11 months; 4 revisions.

PAC-REP-19-04-08 *Structure, processing and performance of UHMWPE, Part 4: Sporadic fatigue crack propagation*, Bucknall, C., Altstädt, V., Auhl, D., Buckley, P., Dijkstra, D., Galeski, A., Gögelein, C., Handge, U.A., He, J., Liu, C.-Y., Michler, G., Piorkowska, E., Slouf, M., Vittorias, I., Wu, J.J. – PAC 92(9), 1521-1536 (2020), 16 pp.

16 April 2019 – 20 March 2020; 11 months; 4 revisions.

PAC-REP-2019-0502 *Global occurrence, chemical properties and ecological impacts of e-wastes (IUPAC Technical Report)*, Purchase, D., Abbasi, G., Bisschop, L., Chatterjee, D., Ekberg, C., Ermolin, M., Fedotov, P., Garelick, H., Isimekhai, K., Kandile, N., Lundström, M., Matharu, A., Miller, B., Pineda, A., Popoola, O., Retegan, T., Ruedel, H., Serpe, A., Shevah, Y., Surati, K., Walsh, F., Wilson, B., Wong, M. – PAC 92(11), 1733-1767 (2020), 35 pp.

6 May 2019 – 5 February 2020; 6 months; 3 revisions.

PAC-REP- 2019-0906 *IUPAC/CITAC Guide: Evaluation of risks of false decisions in conformity assessment of a multicomponent material or object due to measurement uncertainty*, Ilya Kuselman, Francesca R. Pennechi, Ricardo J. N. B. da Silva, David Brynn Hibbert - PAC 93(1), 113-154 (2021), 39 pp.

17 September 2019 – 30 October 2020; 13 months; 2 revisions.

PAC-REP- 18-09-16 *Variation of lead isotopic composition and atomic weight in terrestrial materials*, Xiang-Kun Zhu, Jacqueline Benefield, Tyler B. Coplen, Zhaofu Gao, Norman E. Holden - PAC 93(1), 155-166 (2021), 12 pp.

21 September 2018 – 1 October 2020; 36 months; 4 revisions.

PAC-REP- 2019-0908 *Chemical and biochemical thermodynamics reunification*, Antonio Sabatini, Marco Borsari, Gerard P. Moss, Stefano Iotti - PAC 93(2), 243-252 (2021), 10 pp.

27 September 2019 – 30 November 2020; 14 months; 4 revisions.

PAC-REP- 2020-0403 *Good reporting practice for thermophysical and thermochemical property measurements*, Ala Bazyleva, Jens Abildskov, Andrzej Anderko, Olivier Baudouin, Yury Chernyak, Jean-Charles de Hemptinne, Vladimir Diky, Ralf Dohrn, J. Richard Elliott, Johan Jacquemin, Jean-Noel Jaubert, Kevin G. Joback, Ursula R. Kattner, Georgios M. Kontogeorgis, Herbert Loria, Paul M. Mathias, John P. O'Connell, Wolfram Schröer, G. Jeffrey Smith, Ana Soto, Shu Wang, Ronald D. Weir - PAC 93(2), 253-272 (2021), 20 pp.

22 April 2020 – 19 February 2021; 10 months; 1 revision.

PAC-REC-18-02-08 *Glossary and tutorial of xenobiotic metabolism terms used during small molecule drug discovery and development*, Paul Erhardt, Kenneth Bachmann, Donald Birkett, Michael Boberg, Nicholas Bodor, Gordon Gibson, David Hawkins, Gabrielle Hawksworth, Jack Hinson, Daniel Koehler, Brian Kress, Amarjit Luniwal, Hiroshi Masumoto, Raymond Novak, Phillip Portoghese, Jeffrey Sarver, M. Teresa Serafini, Christopher Trabbic, Nico Vermeulen and Steven Wrighton - PAC 93(3), 273-403 (2021), 131 pp.

26 February 2018 – 26 February 2021; 36 months; 2 revisions.

PAC-REP- 17-10-02 *Interpretation and use of standard atomic weights*, Adriaan M. H. van der Veen, Juris Meija, Antonio Possolo, David Brynn Hibbert - PAC 93(5), 629-646 (2021), 18 pp.

10 October 2017 – 26 April 2021; 42 months; 8 revisions.

PAC-REP- 2020-0905 *Reference materials for phase equilibrium studies. 1. Liquid–liquid equilibria*, Ala Bazyleva, William E. Acree, Robert D. Chirico, Vladimir Diky, Glenn T. Hefter, Johan Jacquemin, Joseph W. Magee, John P. O’Connell, James D. Olson, Ilya Polishuk, Kurt A. G. Schmidt, John M. Shaw, J. P. Martin Trusler, Ronald D. Weir - PAC 93(7), 811-827 (2021), 17 pp.

29 September 2020 – 8 July 2021; 9 months; 1 revision.

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