



## Most Cited Papers in Croatica Chemica Acta

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This report was initiated by Professor Nikola Kallay, the present Editor-in-Chief of this journal, after suggestion by Professor Milan Randić, a member of the Advisory Bord. Professor Kallay asked us to prepare this essay as a result of his e-mail discussions with Professor Randić who found in the article: N. Trinajstić, The 70<sup>th</sup> Anniversary of *CROATICA CHEMICA ACTA* 1927–1997, *Croat. Chem. Acta* **70** (1997) I–IV, the following text he could not confirm: “The most cited paper from *Croatica Chemica Acta* is W. Stumm, C. P. Huang and S. R. Jenkins, Specific Chemical Interactions Affecting the Stability of Dispersed Systems, *Croat. Chem. Acta* **42** (1970) 223–245. Research on which this paper is based was reported at the *Summer School on the Chemistry of Solid/Liquid Interfaces* that was held in Dubrovnik and Cavtat, Croatia, in July, 1970. This article has been cited more than a thousand times.”

Similarly, the guest-authors, Marko Branica, Goran Kniewald and Tarzan Legović, stated in the *Editorial* of the issue of *Croatica Chemica Acta* dedicated to Professor Werner Stumm (1924–1999) (*Croat. Chem. Acta* **71** (1998) I–II): “One of the most significant contributions to *Croatica Chemica Acta* is the paper by W. Stumm, C. P. Huang and S. R. Jenkins, Specific Chemical Interactions Affecting the Stability of Dispersed Systems, *Croat. Chem. Acta* **42** (1970) 223–245. It was reported at the *Summer School on the Chemistry of Solid/Liquid Interfaces* that was held in Cavtat, Croatia, in July, 1970. This article is one of the most cited chemical papers in the the second half of this century (cited more than 1000 times) and became the *Science Citation Classic* in 1990.”

Both statements are unfortunately *incorrect* in the number of citations and in calling this paper as Stumm's most cited paper in *Croatica Chemica Acta*. It appears that the following paper is the most cited contribution by him and co-workers: W. Stumm, R. Kummert and L. Sigg, A Ligand-Exchange Model for the Adsorption of Inorganic and Organic-Ligands at Hydrous Oxide Inter-

faces, *Croat. Chem. Acta* **53** (1980) 291–312. However, both papers made the *This Week's Citation Classic in the Current Contents* issue of November 24, 1990, page 18 (<http://www.garfield.library.upenn.edu/classics1990/A1990DY08700001.pdf>). At that time the first paper was cited in 105 and the second paper in 110 publications. We also found in the *This Week's Citation Classic in the Current Contents* issue of October 10, 1988 that is listed the following book: W. Stumm and J.J. Morgan, *Aquatic Chemistry: An Introduction Emphasizing Chemical Equilibria in Natural Waters*, Wiley-Interscience, New York, 1970 which has been cited over 1400 times. (<http://www.garfield.library.upenn.edu/classics1988/A1988Q213500001.pdf>). This information could be the reason for the erroneous statements from above.

It appears that more than thousand times are cited six papers by Stumm and co-workers published in *Croatica Chemica Acta* in the period of 20 years (1970–1990). All these papers were based on reports at summer schools and conferences on *Chemistry of Solid/Liquid Interfaces* held in several Croatian coastal places (Dubrovnik-Cavtat, Red Island-Rovinj). They were discussed by Garrison Sposito (Department of Environmental Science, Policy and Management, University of California, Berkeley) in his article Adsorption as a Problem in Coordination Chemistry. The Concept of the Surface Complex, in: *Interfacial and Interspecies Processes*, edited by C. P. Huang, C. R. O'Melia and J. J. Morgan, ACS, Washington, 1995, pp. 33–57, in the section entitled The Articles in *Croatica Chemica Acta*, pp. 35–36.

In Table 1, we first give the number of published research papers in *Croatica Chemica Acta* from 1964 to 2008.

Citations of papers published in *Croatica Chemica Acta* have been recorded since 1964 by Institute of Scientific Information (ISI) in Philadelphia and referred to by the *Journal Citation Reports* (JCR), published by ISI. In Figure 1, we give citations in each year from 1964 to

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**Table 1.** The total number of research papers published in *Croatia Chemica Acta* from 1964 till 2008. Note that history papers<sup>(a)</sup> and essays<sup>(b)</sup> are separately listed

Year	Volume	No. of papers	Year	Volume	No. of papers
1964	36	34	1986	59	82
1965	37	45	1987	60	71
1966	38	47	1988	61	60
1967	39	44	1989	62	81
1968	40	40	1990	63	58
1969	41	54	1991	64	63
1970	42	37	1992	65	78
1971	43	43	1993	66	51
1972	44	62	1994	67	46
1973	45	71	1995	68	74
1974	46	36	1996	69	114 + 8 <sup>(a)</sup>
1975	47	63	1997	70	71
1976	48	60	1998	71	81
1977	49	94	1999	72	77
1977	50	31 + 7 <sup>(a)</sup>	2000	73	79
1978	51	42	2001	74	65
1979	52	48	2002	75	67 + 2 <sup>(a)</sup>
1980	53	68	2003	76	50
1981	54	53	2004	77	73 + 2 <sup>(b)</sup>
1982	55	42	2005	78	87
1983	56	68	2006	79	73
1984	57	133	2007	80	75
1985	58	71	2008	81	83 + 1 <sup>(b)</sup>
Total number of papers →			2945 + 20 <sup>(a),(b)</sup>		

2009. It is seen that the number of citations steadily increases, reaching 918 of citations in year 2008 (note that we prepared this report in the mid December of 2009 and thus the number of citations for year 2009 was not the final).

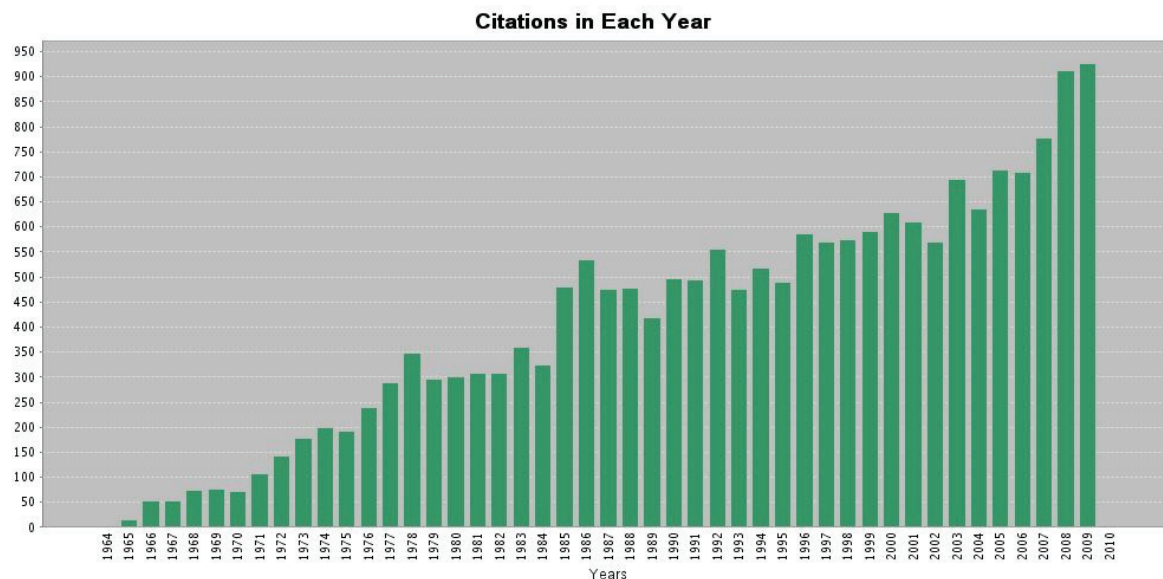
As indicated in JCR, impact factor (IF) of *Croatia Chemica Acta* for year 2008 is 0.831 (standard IF), and its novel version named 5-year IF is 1.000. Standard IF of *Croatia Chemica Acta* calculated without self-citations is 0.777. The percentage part of self-citations in the number of cumulative citations in 2008 (918) is at the level of 6 % (56/918), and is the same (in percentage) as the part of self-citations in years used in IF calculation (8/123).

The total number of citations from 1964 to 2009 is 18848, and the total number of citations without self-citations is 13815 (73 %). In Table 2, we give data on 50 most cited papers, published in *Croatia Chemica Acta* from 1964 to 2008. The following data are taken from the *ISI Web of Knowledge – Web of Science* on December 22, 2009. Among all 3246 papers (2965 research papers from Table 1 together with editorials,

book reviews, etc.) published in *Croatia Chemica Acta* between 1964 and 2008 and recorded in ISI, 2394 papers have  $\geq 1$  citations, *i.e.* about 26 % papers have 0 citations. In addition, there are 537, 195, 85, and 50 papers having  $\geq 10$ ,  $\geq 20$ ,  $\geq 30$ , and  $\geq 40$  citations, respectively.

One can see from this table that the majority of the most cited papers belong to foreign contributors (36 papers), a modest number to Croatian authors (10 papers) and only four papers reporting the collaborative efforts between Croatian and foreign researchers. Among these 14 (10 + 4) papers with Croatian authors, 12 papers have authors from the Rugjer Bošković Institute.

The total number of citations for these 50 papers is 3869, *i.e.* 21 % of the total number of citations (18848) of all papers published in *Croatia Chemica Acta* from 1964 to 2008. Among these 50 papers, there is balance between papers reporting experimental results (26 papers) and papers reporting theoretical results (24 papers). Among 24 theoretical papers, 17 are chemical graph-theoretical papers. Among the foreign contribu-



**Figure 1.** Citations of papers in each year from 1964 to 2009 (till December 22, 2009). Considered are only papers published in *Croatica Chemica Acta* between 1964 and 2008.

tors Werner Stumm has seven papers (five of them are included in Table 2 and two given below) with various collaborators which have been cited 1042 times and among Croatian authors Trinajstić with his collaborators has 9 papers which are cited 615 times (both data are from December 22, 2009).

Two Stumm's papers do not appear in Table 2. The first paper of these two is the last of the six papers based on reports at the summer schools and conferences: W. Stumm, B. Sulzberger and J. Sinnger, The Coordination Chemistry of the Oxide-Electrolyte Inter-

face – The Dependence of Surface Reactivity (Dissolution, Redox Reactions) on Surface-Structure **63** (1990) 277–312 (times cited: 33; December 22, 2009). The last paper is W. Stumm, Catalysis of Redox Processes by Hydrous Oxide Surfaces, *Croat. Chem. Acta* **70** (1997) 71–93 (times cited: 9; December 22, 2009). This paper was dedicated to the late Marko Branica (1931–2004) on the occasion of his 65<sup>th</sup> birthday and appeared in the special issue of *Croatica Chemica Acta* (*Croat. Chem. Acta* **70** (1997) 1–472) dedicated to *Marine Chemistry* as a tribute to the 65<sup>th</sup> anniversary of Marko Branica.

**Table 2.** Fifty most cited papers published in *Croatica Chemica Acta* from 1964 to 2008, taken from the *Web of Science* on December 22, 2009.

No.	Authors	Title	<i>Croat. Chem. Acta</i>	Total No. of papers
				<b>3869</b>
1.	W. Stumm, R. Kummert and L. Sigg	A LIGAND-EXCHANGE MODEL FOR THE ADSORPTION OF INORGANIC AND ORGANIC-LIGANDS AT HYDROUS OXIDE INTERFACES	<b>53</b> (1980) 291–312	346
2.	W. Stumm, C. P. Huang and S. R. Jenkins	SPECIFIC CHEMICAL INTERACTION AFFECTING STABILITY OF DISPERSED SYSTEMS	<b>42</b> (1970) 223–245	296
3.	D. Cremer and E. Kraka	A DESCRIPTION OF THE CHEMICAL-BOND IN TERMS OF LOCAL PROPERTIES OF ELECTRON-DENSITY AND ENERGY	<b>57</b> (1984) 1259–1281	282
4.	W. Stumm, H. Hohl and F. Dalang	INTERACTION OF METAL-IONS WITH HYDROUS OXIDE SURFACES	<b>48</b> (1976) 491–504	210
5.	S. Nikolić, N. Trinajstić and Z. Mihalić	THE WIENER INDEX: DEVELOPMENT AND APPLICATIONS	<b>68</b> (1995) 105–129	129
6.	M. Marsili and J. Gasteiger	PI-CHARGE DISTRIBUTION FROM MOLECULAR TOPOLOGY AND PI-ORBITAL ELECTRONEGATIVITY	<b>53</b> (1980) 601–614	106

(continued)

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No.	Authors	Title	<i>Croat. Chem. Acta</i>	Total No. of papers
				<b>3869</b>
7.	D. Amić, D. Davidović- Amić, D. Bešlo and N. Trinajstić	STRUCTURE-RADICAL SCAVENGING ACTIVITY RELATIONSHIPS OF FLAVONOIDS	<b>76</b> (2003) 55–61	100
8.	J. Lyklema	ELECTRICAL DOUBLE-LAYER ON OXIDES	<b>43</b> (1971) 249–260	93
9.	M. V. Diudea and I. Gutman	WIENER-TYPE TOPOLOGICAL INDICES	<b>71</b> (1998) 21–51	91
10.	S. Nikolić, G. Kovačević, A. Miličević and N. Trinajstić	THE ZAGREB INDICES 30 YEARS AFTER	<b>76</b> (2003) 113–124	87
11.	W. Stumm, G. Furrer and B. Kunz	THE ROLE OF SURFACE COORDINATION IN PRECIPITATION AND DISSOLUTION OF MINERAL PHASES	<b>56</b> (1983) 593–611	87
12.	M. Randić	COMPARATIVE REGRESSION ANALYSIS. REGRESSIONS BASED ON A SINGLE DESCRIPTOR	<b>66</b> (1993) 289–312	85
13.	N. Trinajstić	COMPUTING CHARACTERISTIC POLYNOMIAL OF A CONJUGATED SYSTEM USING SACHS THEOREM	<b>49</b> (1977) 593–633	75
14.	L. Bjelica, R. Parsons and R. M. Reeves	ELECTROCHEMICAL STUDIES ON DIFFERENT GLASSY-CARBON ELECTRODES. 2. CORROSION AND DOUBLE-LAYER CHARACTERISTICS	<b>53</b> (1980) 211–231	73
15.	E. Tipping, J. R. Griffith and J. Hilton	THE EFFECT OF ADSORBED HUMIC SUBSTANCES ON THE UPTAKE OF COPPER(II) BY GOETHITE	<b>56</b> (1983) 613–621	70
16.	M. V. Diudea, M. Stefu, B. Parv and P. E. John	WIENER INDEX OF ARMCHAIR POLYHEX NANOTUBES	<b>77</b> (2004) 111–115	69
17.	M. Šljukić, B. Matković, B. Prodić and S. Šćavničar	PREPARATION AND CRYSTALLOGRAPHIC DATA OF PHOSPHATES WITH COMMON FORMULA $M^I M^{IV}_2(PO_4)_3$ ( $M^I = Li, Ni, K, Rb, Cs$ ; $M^{IV} = Zr, Hf$ )	<b>39</b> (1967) 145–148	68
18.	L. G. Kuzmina and Y. T. Struchkov	STRUCTURAL CHEMISTRY OF ORGANOMERCURY COMPOUNDS. ROLE OF SECONDARY INTERACTIONS	<b>57</b> (1984) 701–724	66
19.	I. Gutman	SOME TOPOLOGICAL PROPERTIES OF BENZENOID SYSTEMS	<b>46</b> (1974) 209–215	62
20.	G. Deželić and J. Vavra	ANGULAR DEPENDENCE OF LIGHT SCATTERING IN PURE LIQUIDS	<b>38</b> (1966) 35–47	62
21.	W. Stumm, B. Wehrli and E. Wieland	SURFACE COMPLEXATION AND ITS IMPACT ON GEOCHEMICAL KINETICS	<b>60</b> (1987) 429–456	61
22.	A. C. Zettlemoyer and E. Mccafferty	WATER ON OXIDE SURFACES	<b>45</b> (1973) 173–187	59
23.	Z. B. Maksić, M. Eckert-Maksić and K. Rupnik	MODEL DESCRIPTION OF SOME MOLECULAR PROPERTIES BY THE MODIFIED-ATOM-IN- MOLECULE (MAM) APPROACH	<b>57</b> (1984) 1295–1353	57
24.	D. M. Cvetković and I. Gutman	NOTE ON BRANCHING	<b>49</b> (1977) 115–121	53

(continued)

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No.	Authors	Title	<i>Croat. Chem. Acta</i>	Total No. of papers
				<b>3869</b>
25.	M. Randić	SEARCH FOR OPTIMAL MOLECULAR DESCRIPTORS	<b>64</b> (1991) 43–54 30	52
26.	D. Cvetković, N. Trinajstić and I. Gutman	GRAPH THEORY AND MOLECULAR-ORBITALS .2.	<b>44</b> (1972) 365–374	52
27.	R. Ponec and F. Uhlík	MULTICENTRE BOND INDICES FROM THE GENERALIZED POPULATION ANALYSIS OF HIGHER ORDER DENSITIES	<b>69</b> (1996) 941–954	51
28.	S. Oae	LIGAND COUPLING REACTIONS THROUGH HYPER- VALENT AND SIMILAR VALENCE-SHELL EXPANDED INTERMEDIATES	<b>59</b> (1986) 129–151	51
29.	L. Gierst, E. Nico- las and L. Tytgat- Vandenberghen	DOUBLE LAYER STUDIES USING DEPOLARIZERS AS PROBE - A REASSESSMENT	<b>42</b> (1970) 117–141	51
30.	P. E. John and M. V. Diudea	WIENER INDEX OF ZIG-ZAG POLYHEX NANOTUBES	<b>77</b> (2004) 127–132	50
31.	F. M. Etzler and W. Drosthans- sen	RECENT THERMODYNAMIC DATA ON VICINAL WATER AND A MODEL FOR THEIR INTERPRETATION	<b>56</b> (1983) 563–592	50
32.	D. Bilba, D. Bejan and L. Tofan	CHELATING SORBENTS IN INORGANIC CHEMICAL ANALYSIS	<b>71</b> (1998) 155–178	48
33.	A. E. Nielsen	TRANSPORT CONTROL IN CRYSTAL GROWTH FROM SOLUTION	<b>53</b> (1980) 255–279	47
34.	M. Branica, D. M. Novak and S. Bubić	APPLICATION OF ANODIC-STRIPPING VOLTAM- METRY TO DETERMINATION OF THE STATE OF COMPLEXATION OF TRACES OF METAL IONS AT LOW CONCENTRATION LEVELS	<b>49</b> (1977) 539–547	47
35.	V. Ullrich, H. H. Ruf and P. Wende	STRUCTURE AND MECHANISM OF CYTOCHROME P450	<b>49</b> (1977) 213–222	47
36.	V. Dhanaraj, M. G. Williams, Y. Qi- Zhuang F. Molina, L. L. Johnson, D. F. Ortwine, A. Pavlovsky, J. R. Rubin, R. W. Skeean, A. D. White, C. Humblet, D. J. Hupe and T. L. Blundell	X-RAY STRUCTURE OF GELATINASE A CATALYTIC DOMAIN COMPLEXED WITH A HYDROXAMATE INHIBITOR	<b>72</b> (1999) 575–591	46
37.	B. E. Conway and H. P. Dhar	SOLVENT STRUCTURE AND MOLECULAR ORIENTATION IN DOUBLE-LAYER AT MERCURY-WATER INTERFACE	<b>45</b> (1973) 109–126	46
38.	D. Amić and N. Trinajstić	ON THE DETOUR MATRIX	<b>68</b> (1995) 53–62	44
39.	R. Mcweeny	WEAK-INTERACTIONS BETWEEN MOLECULES	<b>57</b> (1984) 865–878	44
40.	S. S. Damato, B. M. Gimarc and N. Trinajstić	ISOSPECTRAL AND SUB-SPECTRAL MOLECULES	<b>54</b> (1981) 1–52	44

(continued)

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No.	Authors	Title	<i>Croat. Chem. Acta</i>	Total No. of papers
				<b>3869</b>
41.	A. Slougui, Y. V. Mironov, A. Perrin and V. E. Fedorov	AN OCTAHEDRAL RHENIUM CLUSTER WITH (CN) LIGANDS: THE CRYSTAL STRUCTURE OF $\text{KCs}_3\text{Re}_6\text{S}_8(\text{CN})_6$	<b>68</b> (1995) 885–890	43
42.	L. K. Hanson, S. G. Sligar and I. C. Gunsalus	ELECTRONIC-STRUCTURE OF CYTOCHROME-P450	<b>49</b> (1977) 237–250	43
43.	R. B. Mallion, A. J. Schwenk and N. Trinajstić	GRAPHICAL STUDY OF HETEROCONJUGATED MOLECULES	<b>46</b> (1974) 171–182	42
44.	M. J. S. Dewar and N. Trinajstić	A SCF MO TREATMENT OF SOME TROPONE DERIVATIVES	<b>42</b> (1970) 1–12	42
45.	J. D. Andrade, V. Hlady, A. P. Wei and C. G. Ölander	A DOMAIN APPROACH TO THE ADSORPTION OF COMPLEX PROTEINS: PRELIMINARY-ANALYSIS AND APPLICATION TO ALBUMIN	<b>63</b> (1990) 527–538 28	41
46.	A. T. Balaban and I. Tomescu	CHEMICAL GRAPHS .40. THREE RELATIONS BETWEEN THE FIBONACCI SEQUENCE AND THE NUMBERS OF KEKULÉ STRUCTURES FOR NON-BRANCHED CATA-CONDENSED POLYCYCLIC AROMATIC-HYDROCARBONS	<b>57</b> (1984) 391–404	41
47.	I. Lukovits	THE DETOUR INDEX	<b>69</b> (1996) 873–882	40
48.	W. Koch, P. von Rague Schleyer, P. Buzek and B. Liu	THE $\text{C}_3\text{H}_7^+$ CATION	<b>65</b> (1992) 655–672	40
49.	H. C. van der Plas and M. Wozniak	POTASSIUM-PERMANGANATE IN LIQUID-AMMONIA. AN EFFECTIVE REAGENT IN THE CHICHIBABIN AMINATION OF AZINES	<b>59</b> (1986) 33–49	40
50.	V. Simeon and O.A. Weber	CHELATION OF SOME BIVALENT METAL IONS WITH ALANINE AND PHENYLALANINE	<b>38</b> (1966) 161–167	40

(continued)

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