

Prof. Dr. Mahboob Mohammad

CURRICULAM VITAE

1. Name: Mahboob **Mohammad**
2. Father's Name: Manzoor Mohammad
3. Date of Birth: February 27, 1939
4. Addresses: Res. D-1, Falcon Terrace Clifton, Karachi
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Off. (a) HEJ Research Institute of Chemistry,
University of Karachi, Karachi.

Present Address. International Center for Chemical Sciences
H.E.J. Research Institute of Chemistry,
University of Karachi.
Karachi-75270
e-mail: "Prof. Mahboob Mohammad" <hej@cyber.net.pk>

5. **Academic Career:** B.Sc. (Hons), 1958, Karachi University. Second Class Second Position M.Sc. 1960 Karachi University First Class First Position Ph.D. 1967 New York University, U.S.A Founder Day Award & Citation Certificate of Merit for outstanding academic performance.
6. Position held:
 1. Chairman, Chemistry Department
Quaid-e-Azam University, Islamabad.
Pakistan (1979-80, 1993-96)
 2. Visiting Professor and
Patron Electrochemistry Group Department of Chemistry
Quaid-e-Azam University,
Islamabad.(1999)
 3. Visiting, Adjunct Professor
H.E.J. Research Institute of Chemistry
University of Karachi
Karachi (1997-98)
 4. Visiting Professor Chemistry Department CSU-Northridge
Northridge Ca 91330
U.S.A. (2000-2004)

Present Position: Foreign Faculty Professor, ICCS/ HEJ Res. Inst

7. Honors etc.:

- i. Member of International Societies
- ii. Honorary Faculty Member Columbia University, New York 1970's.
Member of Liason Board for 8th Microchemical Symposium Graz (Austria) Aug. 1980.
- iii. Member of various National and University Committees and Bodies.
- iv. Mentioned in Marquis "Who's Who" Dictionary of International Biography.
- v. Secretary Organizing Committee, National Seminar on Transfer of Technology.
- vi. Member, National Energy, Solid State Cell, UGC.
- vii. On the panel of Reviewer, Journal of American Chemical Society and Anal. Chern.
- viii. Co-Director, International Conference on "Industrial Uses of Electrochemistry" Dec. 7-9, 1982 Islamabad, Pakistan.
- ix. British Council Link Programme Visitor/ Visiting Professor Southampton University, November 1981.
- x. Nominated, Pakistan Science Foundation-Royal Society (London) MOU Visiting Professor.
- xi. Senior Fulbright Scholar 1984-85, Visiting Professor, University of Texas, Austin; Visiting Research Scholar, Stanford University.
- xii. Commendation from Government of Pakistan for writing book "Elementary Quantum Mechanics".
- xiii. Fellow, Chemical Society (Pak).
- xiv. One of the Founders of Fulbright Alumni Association QAU (Secretary FAA 1992-94).
- xv. Chief Organizer 5th National Chemistry Conf. Oct. 1993.
- xvi. On the Editorial Board Transac SAET (India).
- xvii. President, Fulbright Alumni Association QAU - 1995.
- xviii. Trail Blazer Speaker on T.V. 1994 (PTV-2 Lecture Programme)
- xix. *Tamgha-i-Imtiaz* 1998/ 1999.

8. Field of Research:

Electrochemical Studies including Electro-organics, Fast Reactions and Chemistry of Reactive Intermediates, Energy Resources, New Uses of Sulphur, Analytical Application of Voltammetry. Chemical Investigation of Biologically Active Compounds; Polymerization and Electron Transfer Processes; Semiconductor and Superconductor electrodes. Molecular Orbital

Calculations. Potential Energy Surfaces Calculations. (Electrochemical) Impedance Spectroscopy
Electrochemical Studies of Cancer. Information Theory and application in Chemistry.

9. **Ph.D. Supervisor and Co-workers**

- i. Professor B.R. Sundheim, Chemistry Department, New York University, Washington Square, New York, U.S.A (Ph.D. Supervisor).
- ii. Professor E.M. Kosower, Chemistry Department, S.U.N.Y. Stony Brooke, N.Y. U.S.A.
- iii. Professor M. Szwarc FRS, (Late)Distinguished Professor of Chemistry, Polymer Research Centre, S.U.N.Y. Syracuse N.Y. U.S.A
- iv. Professor Allen J. Bard, Chemistry Department, University of Texas Austin Texas.
- v. Professor H. Taube (Late, Nobel Laureate) Chemistry Department, Stanford University, Stanford. Ca. U.S.A

10. **Seminars**, Colloquia, Conferences, Attended and Participated number of International Conferences, Seminars etc. Invited Speaker in Conferences and Symposia.

11. **Teaching Duties.** M.Sc. and M.Phil. courses in Physical Chemistry e.g. Quantum Chemistry, Chemical Kinetics, Electrochemistry etc. Graduate and undergraduate courses, California State University, Northridge, California, USA Research, Guiding M.S.;M. Phil.; Ph.D. and Post Doctoral Students.

12. **Publications:**

- i. More than ninety publications, mainly in International Journals (Viz. Journals of American Chemical Society, Journal of Electro-Analytical Chemistry, Electrochimica Acta, Anal. Chem. and Bulletin of Electrochemistry etc.)
- ii. Several papers accepted for presentation in various International Conferences held in 1980-99.
- iii. A text book "Elementary Quantum Mechanics" got Special Prize-Award from Government of Pakistan in 1987.
- iv. A text book "Principles of Electrode Kinetics" Rooha Press, Lahore, Pakistan 2001.

13. **Services Record:**

Teaching Fellow, New York University (1961-66), Post-Doctoral Research Associate, State University of New York, Stony Brook (1967-69). Assistant Professor, Quaid-i-Azam University (1969-73), Associate Professor (1974-82), Chairman, Chemistry Department, Quaid-i-Azam University, Islamabad, Pakistan November 1979 to August 1980 and 1993-96. Visiting Associate Professor, College of Env. Sciences and Forestry. SUNY Syracuse N.Y. 1975-76. Professor 1982. Visiting Professor, University of Texas, Austin, Texas (1984) Visiting Scholar Stanford University (1985), Visiting Professor HEJ Research Institute of Chemistry, University of Karachi (1997-98). Adjunct Professor HEJ Research Institute of Chemistry (1998-2004), Professor, QAU, BPS-21 June 1998 February 1999. Visiting Professor, Chemistry Department, Quaid-i-Azam University, Islamabad, Sept. 1999 - Jan. 2000. Visiting

Professor, Chemistry Department, CSU-Northridge, California, USA Sept. 2000 to Dec. 2004
Foreign Faculty Professor, HEJ Res. Inst Of Chemistry Jan 2005-.

14.

- a) Established the "Electrochemistry Group" in Quaid-i-Azam University.
- b) As a Member of the University Grants Commission Study Group on Examination (1974), was architect of (bringing) the Semester System in Pakistani Universities.
- c) Proposed amendment in the 1973 Quaid-i-Azam University Act and an amendment related to the power/duties of the Vice-Chancellor were approved by the National (Legislative) Assembly.
- d) Established a Charity Trust in Chemistry Department, Quaid-i-Azam University, Islamabad.
- e) Established Superconductivity and an Impedance Spectroscopy Laboratory in Chemistry Department, Quaid-i-Azam University, Islamabad.
- f) Established a "Nucleus" of Computational Chemistry in Chemistry Department, Quaid-i-Azam University, Islamabad.

15. Special Qualification handling of high vacuum technique and glass blowing.

16. Hobbies: Reading classical Urdu literature and other nonfiction books; writing serious and satirical poetry; Drawing/Sketching; Music.

17. **Miscellaneous:**

Courses I gave at

- (a) HEJ (1997) (i) Mathematics for Researchers (ii) Elements of Organic Electro Chemistry (iii) Elementary Molecular Orbital Chemistry for Organic Chemists.
- (b) Northridge (2000-2004) (i) General Chemistry (Freshman), (ii) Electrochemistry (Graduate) (iii) Chemical Kinetics (Graduate) (iv) Physical Chemistry Lab. Course (B.S.).
- (c) HEJ Res. Inst (2005-2006) Mathematics for Chemists; Elementary Quantum Mechanics for Chemists.
- (d) HEJ Res. Institute. Mathematics (TM301); Electrochemistry (Chem. 741)

Introduced two experiments in B.S. Physical Chemistry Lab. Course CSU-Northridge

- (a) Hydrogen Bonding Studies by Cyclic Voltammetry,
- (b) Electrical measurements of A High Tc Superconductor; Y-Ba -Cu-O

Designed and helped HEJ Faculty in Organizing Courses.

Helped and helping ICCS/HEJ Res. Inst. In Implementation of full-fledged Semester System. Also Convenor of half a dozen Academic Committees.

Research at CSUN:

Co-Supervisor of two M.S. students on streptogirin, Anilino Quinoline Quinone and their

metal, complexes and high Tc superconductors.
 Helped Department of Chemistry, CSUN, in the field of electrochemistry and superconductivity and in setting up a superconductivity/ material chemistry research lab.

Research at HEJ: Setting up Electrochemistry and Free Radical Research Lab.

Last 10 years (since 1996)

S. No.	Title	Funding Agency	Duration	Ph.D.	M.Phil.	Fund Amount
1.	Studies on high Tc Superconductors	National Scientific Research Board	3 years	1	2	Rs. 800,000/-
2.	Impedance Studies on high Tc superconductors	P.S.F.	3 years	2	2	Rs. 900,216/-
3.	Studies on dinitro aromatics	Q.A.U. Research Fund	1 year	-	1	Rs. 50,000/-
4.	Direct and Indirect Attack on Cancer Cells	P.S.F.	Continuing ; Initiated Oct. 2001	2		Rs. 803,816/-
5.	Streptonigrin and anilinoquinoline quinone electrochemistry and metal complex	CSU-Northridge	Continuing; Initiated in 2001	-	1	-
6.	Studies on high Tc super conductor	CSU-Northridge	Continuing initiated in 2002	-	1 M.S.	US \$ 10,000/-

7.	Electrochemical Studies on Br. Atom	HEC F F	2-years	-	2-M.Phil	Rs.1.0 M
8.	Studies on Reactive Intermediates and Anti-oxidants	HEC	3-years		2-Mphil/Ph.D	3.156M

Literary

Lectures: Golden Jubilee Lecture at Chem. Dept Karachi University May 29, 05.; Lecture at Bazme Sciency Adab June 22, 06,

Articles Story of Two Campuses: Golden jubilee Magazine; Moday Blues (Peer JO Baatain); Editor ICCS Newsletter

Review: (a) Manuscript: Monograph on Electrochemistry from HEC, (b) Ph.D. Thesis, Dhaka University (2006) , (c) Articles for J. Chem. Pakistan.

Hobbies. Urdu Literature (reading, writing), Urdu Poetry (reading and writing). Music (Listening Classical, semi-classical, Eastern, Western)

Prof. Dr. Mahboob Mohammad
LIST OF PUBLICATIONS

1. RH. Siddiqui and M. Mohammad, "Bittern from Arabian Sea Salt and its utility as an electrolyte in wet and dry cells", Proc. Pan. Z- Ocean. Soc. Cong 4th Karachi (Pakistan) SeeF. 1960,257-62 (1964).
2. RH. Siddiqui and M. Mohammad, "Chemicals from Arabian Sea Salt", Ibid, 2639 (1964).
3. M. Mohammad and B.R.Sundheim, "¹⁴N-Hyperfine Structure of Triphenylaminium Radical Ions", *Theoret, Chim. Acta*, **10**,222 (1968).
4. E.M. Kosower and M. Mohammad, "The Solvent Effect on An Electron Transfer Reaction of Pyridinyl Radical", *J. Am. Chem. Soc.*, **90**,71, (1968).

5. M. Mohammad and E.M. Kosower, "Solvent Polarity in Electrochemical and other Salt Solution Studies", *J. Phys. Chem.*, **74**, 1153 (1970).
6. M. Mohammad and E.M. Kosower, "Stable Free Radical V. The reaction between 1-ethyl-4-carbomethoxy Pyridinyl Radical and Benzyl Halides", *J. Am. Chem. Soc.*, **93**, 2709 (1971).
7. M. Mohammad and E.M. Kosower, "Stable Free Radical VI, The Reaction between 1-ethyl-4-carbomethoxy Pyridinyl Radical and 4-nitrobenzyl compounds", *J. Am. Chem. Soc.* **93**, 2713 (1971).
8. M. Mohammad, J. Hajdu and E.M. Kosower, "Radical Anions From 4-nitrobenzyl compounds", *J. Am. Chem. Soc.* **93**, 1792 (1971).
9. Saeedan Begum and M. Mohammad, "Pi-electron Spin Density Calculation on Allyl Radical", *Pak. J. Sci. and Ind. Res.* **11**, 359 (1972).
10. M. Mohammad "Reaction between 4-nitrobenzoyl chloride and 1-ethyl-4-methoxy carbonyl Pyridinyl Radical", *Aust. J. Chem.*, **26**, 229 (1973).
11. M. Mohammad, M. Saleem, Saleem Qureshi and Imtiaz Hanif: "Cyclic Voltammetric Studies Part 1, 1-Ethyl-4-Carbomethoxy Pyridinium Iodide in Acetonitrile", *Pak. J. Sci. and Ind. Res.*, **16**, 233 (1973).
12. M. Mohammad, "Huckel Mol-orbital Calculation and Spin Polarization Parameter in a Trivalent Nitrogen: Tris-p-Nitrophenylamine cation" *Pak. J. Sci. & Ind. Res.*, **16**, 233 (1973).
13. M. Mohammad, A. Y. Khan, M. Afzal, A. Nisa and Riaz Ahmed, "Cyclic Voltammetric Studies II, "Substituted Anilines in Acetonitrile", *Aus. J. Chem.*, **27**, 2495 (1974).
14. M. Mohammad, "Electron Transfer Reaction Between 1,3-dinitrobenzene and Methyl 1-ethyl pyridine-4-carboxylate Radical", *J. Chem. Soc. Perkin Trans.* **11** No.6, **1975**, 526 (1975).
15. M. Mohammad, "Cyclic Voltammetric Investigation of a Chemical Reaction Preceded by a Reversible Charge Transfer: Reaction of Pyridinyl Radical with 4 nitro benzyl Chloride", *Anal. Chem.*, **47**, 958 (1975).
16. M. Mohammad, "A single sweep cyclic voltammetric method for determining the rate of decomposition of ionic species generated on a stationary Electrode and undergoing ECE mechanism", *Pak. J. Sci. and Ind. Res.* **18**, 7 (1975).
17. M. Mohammad, Riaz Ahmad, J.M. Taqi and S.U. Sheikh, "Cyclic Voltammetric studies Part III Stability of 4-nitroaniline and 1-Nitronaphthalene Anion Radical in Alcoholic, Nitrilic and Mixed solvent system", *Pak. J. Sci. and Ind. Res.*, **18**, 4, (1975).
18. M. Mohammad and M. Alimuddin, "Analytical Application of Linear Scan and/or Cyclic Voltammetry Peak Current", *Pak. J. Sci. & Ind. Res.* **18**, 123 (1975).
19. G. Levin, B. Lundgran, M. Mohammad and M. Szwarc, "The Strange Behaviour of Lithium salt of Tetraphenylethylenes Dianion", *J. Am. Chem. Soc.* **98**, 1461 (1976).
20. M. Mohammad, "Spin polarization parameter in Trivalent Nitrogen Aromatic Aminium radical Ions", *J. of Maths and Sci. (Islamabad J. of Sci.* **1**, 127

- (1974).
21. M. Mohammad, "A single Two Electron Transfer or a High Disproportionation Electrochemical Reduction of Dinitrobenzyl" *Electrochim. Acta*, **22**, 487 (1977).
 22. M. Mohammad, "Reaction of K-Crown with 1-3 dinitrobenzene and 4-nitrobenzyl fluoride", *Pak J. Sci. and Ind. Res.* **19**,206 (1976).
 23. M. Mohammad, "Application of Line shape of Linear Scan and Cyclic Voltammogram", *Anal. Chem.* **49**, 60 (1977).
 24. M. Mohammad, S.U. Sheikh, M. Iqbal, R Ahmad, A Y. Khan and M. Razaq, "Protonation of Pyridinyl Radical", *J. Electro Anal. Chem.*, **89**, 431 (1978).
 25. M. Mohammad and M. Razaq, "Stopped-Flow Voltammetry". The paper was accepted for presentation in ERROANALYSIS III, Conference, Ireland 1978. (Abst 242-p). Extended work published in *J. Electro Anal. Chem.* **98**, (2), 235 (1979).
 26. M. Mohammad, A Y. Khan, M. Iqbal, R Iqbal and M. Razaq, "Pyridinyl Radicals, Pyridinyl Anion. Z-values", *J. Am. Chem. Soc.*, **100**, 7658 (1978).
 27. M. Mohammad, Shahid Bilal Butt, R. Iqbal and M.D. Bhatti, "Voltammetry and Drug Synthesis Part 1. Voltammetric Studies on Oxidation of Picoline for Picoline Aldehyde", Proceedings of the 2nd International Symposium Industrial and Oriented Basic Electrochemistry. Madras. India Dec. 1980 (2-17).
 28. M. Mohammad, R. Iqbal, A Y. Khan, K. Zahir and R. Jahan, "Are Pridinyl Radicals Really the Reactive Intermediates", *J. Electroanal Chem.* **124**, 139 (1981).
 29. M. Mohammad, R. Iqbal, A Y. Khan, M. Bhatti, K. Zahir, -and Riffat Jahan, "Protonation of Higher Reduction Products of Pyridinium Salts", *J. Phys. Chem.* **85**,2816 (1981).
 30. M. Mohammad and M. Iqbal, "Solvation Free Energies of Transfer of Anion Radicals: 4-Nitroaniline Anion Radical in Acetonitrile-Water Mixed Solvent System", *J. Electro Chem. Soc. (India)*, **30**, 204 (1981).
 31. M. Mohammad, "In Quest of a Simultaneous Two Electron Transfer: Does a Simultaneous Two-Electron Transfer Occur in Organic (Electron Transfer) Process?" *J. Chem. Soc. Pak.*, **3**,103 (1981).
 32. M. Mohammad, "Does a Simultaneous Two Electron Transfer Occur in the System Tetraphenyl Ethylene and Its Dianion"? *Pak J. Sci. & Ind. Res.* **26** ,4. (1983).
 33. M. Mohammad, AY. Khan and R Iqbal, "Biochemical Reactions Through Charge Transfer Complex Formation or Ion Pair Formation" accepted for presentation, International Symposium on Bioelectrochemistry and Bioenergetics Sept. 4, 1983. Nottingham. *J. Chem. Soc. Pak.* **6** (1984),263.
 34. M. Mohammad and S. Azhar Ali, "Voltammetric Method For the Determination of Sulphur: Plasticized Sulphur Construction Material". *Pak. J. Sci. & Ind. Res.* **28** ,97(1985).
 35. M. Mohammad, K. Ali, AY. Khan and R Iqbal, "Photo oxidation of Liquid Sulphur by Iron (III) Salt. *Intl. J. Energy Res.* **9** ,172(1985).

36. M. Mohammad, Tariq Mahmood, A Y. Khan and R Iqbal, "Charge Transfer Complex-Ion Pair Equilibria-Electrochemical Studies on Charge Transfer Complex 1-Ethyl-4-Carbomethoxy Pyridinium Iodide", *Bull: Electrochem.*, **1** No.3. 333(1985).
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38. M. Mohammad, R Iqbal, A.Y. Khan, K. Zahir and R Jahan, "Factors Governing the Herbicidal Properties of Paraquat 1,1' -Dimethyl Bipyridilium Dichloride", *J. Chem. Soc. (Pak)*, **7**, 141(1985),.
39. M. Mohammad, P.K.Butt and M. Aslam, "Solvation Free Energies of Transfer of Anion Radicals Part 2. *J. Electrochem. Soc. (India)*, **35**, (1986), 37.
40. M. Mohammad, R. Qureshi, R Iqbal and A Y. Khan, "Electron Affinities of Charged Species I", *Bull. Electrochem.* **2** 567(1986).
41. M. Mohammad, A Y. Khan, R. Iqbal and A Ali, "Sulphur in Low Cost Housing Some Studies in Plasticization, *Arab J. Sci. & Tech.* **12** ,199(1987),.
42. M. Mohammad, "Methyl Viologen Neutral", *J. Org. Chem.*, **53**, 2779(1987).(This paper declared as Scholarly Paper www.google.com.pk/search?hl=en&q=J.+Phys.+Chem.+Vol+85+page+2816
43. M. Mohammad, R Qureshi, A,Y. Khan, R. Iqbal and T. Mahmood, "Reversible Electrode Potential, Part II. *Bull. Electrochem.* **3** No.3. 267 (1987).
44. M. Mohammad, Viqar-un-Nisa, A Y. Khan and R. Iqbal, "Application of Area Under the Curve...",*Pak. J. Sci. Ind. Res.* **30** 258(1987).
45. M. Mohammad, A Y. Khan and Romana Qureshi, "Home Computer in Molecular Orbital Calculation", Part 1. *Pak. J. Sci. Ind. Res.*, **30** 359(1987).
46. M. Mohammad, "The Role of Methyl Viologen on the Reduction of CO₂ *J. Electrochem. Soc. (India)*, **36**, 75 (1988).
47. M. Mohammad, Tariq Mahmood, Tahir Jamil and A Y. Khan, "Optical and Voltammetric Studies on Tetraphenyl Ethylene", *Collec. Czech. Chem. Commun.*, **53** 61(1988).
48. M. Mohammad, AY. Khan, R Iqbal, T. Mahmood, I Fatima and R Shaheen, "Charge Transfer Complex-Ion Pair Equilibria, Z-Values and Exchange Reaction" *J. Chem. Soc. (Pak)*. **10**, 71(1988).
49. M. Mohammad, "Voltammetric Studies on Multicenter Bispyridilium Compounds", *Electrochim. Acta*, **33** ,417(1988).
50. M. Mohammad, Najma P. Dost, M. Jalil, R Qureshi, M. Saleem, A,Y. Khan and R. Iqbal", Electron Affinities of Charged Species Part II, ... ", *Bull. Electrochem.* **4** ,287(1988).
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52. M. Mohammad, A.Y. Khan, R. Iqbal and F. Shagufta, "A Low Cost

- Polarograph", *Pak. J. Sci. Ind. Res.* **31**, 733(1988).
53. A Y. Khan and M. Mohammad, "Establishment of an Institute of Petroleum and Energy" in Commemorative Volume. Hijra centenary 1980-81, Islamabad (1988) Strategies for Transfer of Technology.
 54. M. Mohammad, AY. Khan, Amtul Naseer, Shahnaz Malik, M.S. Subhani, A Maqsood, B. Sulemen and I. Haq, "YBa₂Cu₃O₇, A High Temperature Superconductor" *Bull. Electrochem.* **5**, (No. 12), 893 (1989).
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 56. M. Mohammad, A Y. Khan and R. Qureshi, "Home Computer in M.O. Calculation Part II, *Pak. J. Sci. Ind. Res.*, **33**,3 (1990).
 57. M. Mohammad, AY. Khan, T. Mahmood, I Fatima, R. Shaheen and R Iqbal, "Charge Transfer Complex, Chemical Shift and Buckingham equation", *Coll. Czech. Chem. Commun.*, **55** 2131(1990).
 58. M. Mohammad, "Ultrasonic Voltammetry", *Bull Electrochem.* **6**, 806 (1990).
 59. M. Mohammad, AY. Khan and S. Malik, "Superconductivity in Y-Ba-Ca-Cu-O.", *J. Mater. Sci. (Material in Electronics)* **1**, 209 (1990).
 60. M. Mohammad, AY. Khan, R Iqbal, I.A Khan and T. Mahmood, "Dipole Moment of the Charge Transfer Complex-1-Ethyl-4-Carbomethoxy Pyridinium Iodide, *Collect. Czech. Chem. Commun.*, **56**, 560 (1991).
 61. A Y. Khan, M. Mohammad, S. Malik and S.K. Hasnain, "Superconductivity in Bi-Sr-Mg-Cu-O", *Mod. Phys. Lett.*, (B), **5**, 771 (1991).
 62. M. Mohammad, A Y. Khan, M.S. Subhani, W. Begum, N. Ashraf, R Qureshi and R Iqbal, Protonation of Anion Radicals" *Res. Chem. Intermediates* **16**, 29 (1991).
 63. M. Mohammad, A. Y. Khan, R Qureshi, N. Ashraf and W. Begum, "Heterogeneous Electron Transfer rate constant for the second reduction process of some dinitroaromatics, *Collec. Czech. Chem. Commun.*, **57**, 1410 (1992).
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 65. Shahnaz Malik, M. Mohammad, AY. Khan and M.S. Subhani, "Superconductivity in Y-Ba-Na-Cu-O", *J. Mater. Science. Lett.* **12**, 814 (1993).
 66. M. Mohammad, A Y. Khan, M. S. Subhani, S. Malik and U. Akhtar, "Impedance Studies on Metallic, Nonmetallic-, Semiconductor-, and Superconductor ceramic electrodes", *Bull. Electrochem.* **10**, 180 (1994).
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- Bull. Electrochem.* **10**,218 (1994).
- 69 Wahab, N. Murtaza, M. Mohammad, AY. Khan and M.S. Subhani, "Electrochemical impedance spectroscopy studies on ultramicro-array electrode", *Sci. Int. (Pak)* **6**, 117 (1994).
 - 70 M. Mohammad, AY. Khan, M.S. Subhani and M. Yousaf "M.O. calculations to interpret spectra of MV *J. Chem. Soc. (Pak.)* **19**, 1 (1997).
 71. M. Mohammad and R Qureshi, "The use of HMO, w-technique and SCF/UHF Bond Ordes in", *J. Chem. Soc. (Pak)* (accepted).
 72. Viqar-un-Nisa, R. Ahmed and M. Mohammad, "Square wave voltammetric method", *Nucleus*, **35**, 55 (1996).
 73. Viqar-un-Nisa, R. Ahmed and M. Mohammad, "Effects of adsorbents complexing agents...", *Pak. J. Sci. Ind. Res.* **37**, 33(1996)
 74. M. Mohammad, AY. Khan, M.S. Subhani, F. Haneef and S. Yasmeen, "An electrochemical cell for ESR", *J. Electrochem Soc. (India)*, **46**, 150 (1997).
 75. M. Mohammad, A Y. Khan, M.S. Subhani, Nasim Murtaza, Rohila Wahab and Shahnaz Malik, Voltammetric Studies on micro-, ultramicro-, ...Part 1: Evaluation of diffusion coefficient, *J. Electrochem. Soc. (India)*, **47**, 207 (1998).
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 85. V. Nisa, Riaz Ahmed and M. Mohammad, "Levels of", *Int. J. Env. Anal. Chem.* 2003 (submitted).

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88. M. Mohammad, A. Y. Khan, M. S. Subhani, Sabahat Yasmeen, Shahnaz Malik and M. Nadeem, "Room Temperature impedance and ac conductivity ..." Journal Of Superconductivity (in press)
89. M. Mohammad, "Heterogeneous electron transfer rate constants and fractal surface", *Under Revision*
- 90 M. Mohammad and M. Aslam, Experimental and Theoretical Hetero-geneous Electron Transfer Rate Constants for the Reduction of Pyridinium Compounds, Electrochim Acta to be resubmitted
91. Heterogeneous Electron Transfer Rate Constant for the Second Reduction Process of some heteroatom-system and Marcus Theory. Abstract accepted for presentation in XII International Conference on Phys. Org Chem. Poland August 2006. Full paper being written.

Books Etc.

A. Published:

1. Mahboob Mohammad "Elementary Quantum Mechanics for Chemistry Students", Quaid-i-Azam University Press, 1977 (Awarded special Prize by Government of Pakistan).
2. M Mohammad and A Y. Khan (Ed.), "Proceedings of the Conference on Industrial Uses of Electrochemistry" Dec. 1982.
3. M Mohammad (Ed), "Commemorative volume on Hijra Centenary: Strategies for Transfer of Technology and Development of Science and Technology in the Muslim World with Special Reference to Pakistan".
3. M Mohammad and M. Amjad, "Principles of Electrode Kinetics", Rooha Press, Lahore, 2001.
4. M. Mohammad *Ibtadai Quantum Meekaniat*, (Book), Urdu University. To be published

B. Under Preparation:

1. Translation of the book, "Elementary Quantum Mechanics" in national language of Pakistan Urdu.
2. Elements of Electrochemical Spectroscopy: Linear Scan and Triangular Wave Cyclic Voltammetry.
3. M.M. Lectures on Mathematics for Chemists.
4. M.M. Lectures on Molecular Orbital Theory for Organic Chemists.
5. M.M. Lectures on Chemistry for non-Chemistry major students.
6. M.M. Lectures on Chemical Kinetics.
7. M.M. Lectures on Basic Electro-Organic.

Papers Presented or Accepted For Presentation in Conferences

1. M. Mohammad, "The Importance of Z-values (Solvent polarity Parameter). In Disproportionation Equilibrium etc. Studied by Cyclic Voltammetry" J. Heyrovsky Memorial Congress, Prague, Czechoslovakia Aug. 1980. Abstract Page 119.
2. M. Mohammad and Jasim M. Taqi, "Voltammetric Studies in Microliter Quantities of Solution "Microchemical Symposium, Graz, Austria Aug. 1980. Abstract Published.
3. M. Mohammad, S. Balal Butt, R. Iqbal and M.D. Bhatti, "Voltammetric Studies on oxidation of Picoline for Picoline Aldehyde", Proceedings of the 2nd International Symposium Industrial and Oriented Basic Electrochemistry Madras (India) Dec. 1982 (2-17).
4. M. Mohammad and S.B. Butt, "Evaluation of Reversible Electrode Potentials for Chemically Coupled and Irreversible Processes" Accepted for Presentation in EURO ANALYSIS IV -HILISINKI 1981.
5. M. Mohammad, Ismat Fatma, Tariq Mahmood, A.Y. Khan and R Iqbal "Some Proton Magnetic Resonance Studies on the Charge Transfer Complex 1-Ethyl-4-Carbomethoxy Pyridinium Iodide", First International Conference on Industrial Uses of Electrochemistry, Islamabad (Pakistan) Dec. 7, 1982.
6. M. Mohammad, A Y. Khan, R. Iqbal, K. Zahir, T. Jamil and Romana Qureshi, some Electrochemical and M.D. Studies on Herbicide Paraquat and Related Compounds", 1st International Conference on Industrial Uses of Electrochemistry, Islamabad (Pakistan). Dec. 1982.
7. M. Mohammad, A Y. Khan and R Iqbal, "Biochemical Reaction Through Charge Transfer Complex Formation or Ion Pair Formation? International Symposium on Bioelectrochemistry & Bioenergetion. Sept. 4, 1983. Nottingham, u.K.
8. M. Mohammad, "Controlled Potential Differential Pulse Polarography on a stationary Electrode", 3rd International Symposium SAEST (India) Dec. 1984.
9. M. Mohammad, "Effect of Ultrasonic Waves on the Cyclic. Voltammetric Curves", Electro Finn Analysis, International Conference. Tarku Finland June 6-9, 1988, Accepted for Presentation as Poster Presentation.
10. M. Mohammad, "Ultrasonic Voltammetry on a Glassy Carbon Electrode", International Symposium on Microchemical Techniques. Wiesbaden W. Germany (Aug. 28 - Sept 1989) (accepted).
11. M. Mohammad and A Y. Khan, "Electrochemical Studies on High Tc Superconductor Ceramic $YBa_2Cu_3O_{7-x}$ " "Fourth International Symposium

- Frontiers of Electrochemistry Madras 14-16 Nov. 1989 (Abstract accepted).
12. M. Mohammad, "Evaluation of Heterogeneous Electron Transfer Rate Constants" Symposium on Modern Trends in Contemporary Chemistry, Islamabad, March 6-8 (1990) Invited Lecture.
 13. M. Mohammad, "Protonation of Reactive Intermediates", Second National Chemistry Conference Karachi), Dec. 28-31, 1990. Invited Speaker. (Lecture could not be delivered).
 14. M. Mohammad, A Y. Khan, S. Subhani, W. Begum, N. Sharaf and R Iqbal, "Reaction of Reactive Intermediates by Stationary Electrode Polarography: Protonation of Dianions of some Dinitroaromatics", Abstract, Proc. J. Heyrovsky Centennial Congress in Polarography. Prague Czechoslovakia Aug. 25, 1990, 76-65.
 15. M. Mohammad, A Y. Khan, U. Akhtar, S. Malik, M.S. Subhani and R Wahab, "Impedance Spectroscopic Studies on High Tc Superconductors", Second International Symposium on Electrochemical Impedance Spectroscopy Santa Barbara, California July 12-17 (1992) (Accepted for Presentation).
 16. M. Mohammad, "Theoretical and Computational Chemistry", Plenary Lecture, U.G.C. Workshop on Theoretical and Computational Chemistry", Feb. 6, '93 Islamabad.
 17. S. Yasmeen, M.S. Subhani, A Y. Khan and M Mohammad, "Cyclic Voltammetric and Electron Spin Resonance Spectroscopic Studies of Methyl Viologen and Tempol Radical", 5th National Chemistry Conference, Oct. 25-28, 1993 Islamabad, Pakistan.
 18. R Wahab, S. Malik, M. Mohammad, A Y. Khan and M.S. Subhani, "Electrochemical Impedance Spectroscopic Studies on YBa₂Cu₃O_{7-x} Superconducting Ceramic Electrodes Covered with porous membrane", *Ibid.*
 19. Romana Qureshi and M. Mohammad, "Calculation of Potential Energy Surfaces from Ion Pairs derived from the alkali and alkaline earth reduction of some substituted ethylenes", *ibid.*
 20. S. Malik, M Nadeem, A.Y. Khan, M. Mohammad and M.S. Subhani, "Characterization of Mg doped Y_{0.3}Ba_(0.7-x)Mg_xCuO_(3-z) samples and their electrochemical studies", *ibid.*
 21. M. Mohammad, A.Y. Khan, M.S. Subhani and S.M. Yousaf, "Methyl Viologen Neutral (MV⁰) Optical Spectra of MV⁰ and related species, *ibid.*
 22. R Wahab, N. Murtaza, M. Mohammad, A Y. Khan and M.S. Subhani, "Electrochemical impedance spectroscopic studies on Ultra microelectrodes, *ibid* (poster).
 23. Farzana Hanif, M.S. Subhani, A.Y. Khan, M. Mohammad and Abid Latif, "Study of nitrobenzene-nitrobenzene anion radical electron transfer reaction in acetonitrile, *ibid.* (poster).
 24. Viqar-un-Nisa, R. Ahmed and M. Mohammad, "Comparative studies between voltammetry and atomic absorption spectroscopy" Natl. Symp. on Spect. For Mater. Anal., March 4-6 (1995) in press.
 25. M. Mohammad, A.Y. Khan, M.S. Subhani and Farzana Hanif, "Solvent effect on the protonation of anion radical of 1,3-dinitrobenzene" Royal Society of Chemistry (London). Annual Meeting of the Fast Reaction in Solution,

- Discussion Group, Sept 1996 (Graze, Austria).
26. M. Mohammad *et al.* "Protonation of anion radicals and dianions of dinitroaromatics", FRIS '97 Bronsted Symp., Copenhagen 1997 (accepted for presentation).
 27. M. Mohammad, AY. Khan, M.S. Subhani and S. Yasmeen, "A more generalized equation for AC-conductivity in polycrystalline materials", 36th IUPAC Conf, Geneva Aug. 1997 (accepted for presented).
 28. S. Yasmeen, M. Mohammad, A Y. Khan, M.S. Subhani and. "Two probe impedance studies on HoBa₂Cu₃O_{7-x}, Abstract accepted in 8th Natl. Chern. Conf (1997).
 29. S. Yasmeen, M. Mohammad, AY. Khan and M.S. Subhani, "Effect of sintering on RBa₂Cu₃O_{7-x} (R=Ho, Y) Ceramic. Abstract accepted in 6th All Pakistan Science Conference (1997).
 30. M. Mohammad, AY. Khan, M.S. Subhani and S. Yasmeen, "A generalized equation for AC-conductivity and its ramification. Does Cu⁺ give rise to..." 9th Natl. Chern. Conf: Karachi 1998 (presented by M.M.).
 31. S. Yasmeen, M. Mohammad, A Y. Khan and M. Nadeem, "Impedance Measurements on 1-2-3-superconducting ceramics at various temperatures T>T_c, 9th Natl. Chem. Conf: Karachi 1998 (presented by S.Y.).
 32. M. Mohammad, AY. Khan, M.S. Subhani, S. Yasmeen and M. Nadeem, Room Temperature impedance measurements on 1-2-3-superconductor ceramics", 9th Natl. Chern. Cont: Karachi 1998 (presented by S.Y.)
 33. M. Mohammad, "Viologens" Plenary Lecture, 9th Natl. Chern. Cont: Karachi 1998.
 34. A Y. Khan, M. Mohammad, S. Malik and M.S. Subhani, "Effect of potassium substitution on Y_{0.3}Ba_{0.7-x}K_xCuO₇", 9th Natl. Chem. Conf: Karachi 1998 (presented by AYK).
 35. N.K. Janjua, M Mohammad, A Y. Khan and M.S. Subhani, "Applicability of Buckingham equation to ring proton chemical shifts of PyI in CHCl₃ + CH₂Cl₂ solvent mixtures" 9th Natl. Chern. Cont: Karachi 1998 (Abstract accepted for presentation).
 36. M. Mohammad, "Infonation and Physico-Chemical Processes" - Plenary Lecture, 10th Natl. Chem. Conf. Islamabad, 1999.
 37. M. Mohammad, "Electroanalytical Techniques in Environmental Analysis", Plenary Lecture, Executive Management Seminar on Environmental Pollution Monitoring Techniques, March 24, 1999.
 38. M. Mohammad, A Y. Khan, M.S. Subhani, N. Bibi, Safeer Ahmad and S. Salimi, "Kinetics and Electrochemical Studies on Superoxide", 10th National Chemistry Conference, Islamabad, 1999.
 39. Viqar-un-Nisa, Riaz Ahmed and M. Mohammad, "Effect of Adsorbents/ Complex -ing agents on voltammetric analysis", 10th Natl.. Chem.Coferece Islamabad 1999.
 40. Shahid Amin, AY. Khan, M. Mohammad, M.S. Subhcirii and S.M. Hasany, "Spectrophotometric determination of chromium metal by using rhodomine B", 10th Natl. Chern. Conf Islamabad, 1999.

41. M. Mohammad, AY. Khan, M.S. Subhani, R Iqbal and N. Kausar, "Nuclear Magnetic Resonance Studies of Py I and application of Buchingham Equation", 10th Natl. Chern. Conf. Islamabad, 1999.
42. Mahboob Mohammad, "Spectroelectrochemistry", Plenary Lecture 7th National symposium on Analytical and Environmental Chemistry", Center of Excellence in Analytical Chemistry, University of Sindh, Jamshoro, Pakistan, March 4th-5th, 2003
43. Mahboob mohammad, Ahsana Dar, Sajid Jahaingir, Iftikhar Ahmad Tahiri, M.S. Subhani and K.M. Khan, "Friendly Free Radicals ..." Presented (by Sajid Jehangir), Eurasia Conference Turkey, Sept 10, 2006
44. Anti-oxidative Properties of Miswak, M. mohammad, Tahir Soomro. Abstarct Accepted fpr Poster Presentation in Chemistry Conference , Nov. Faisalabad.
45. Generation and chemical Reactions of bromine atom free radical" Abstrct accepted for Poster Presentation in Chemistry Conference , Nov. Faisalabad.

Important Contribution Milestones

1. Use of Unrestricted Hartree - Fock with Annihilation in trivalent Nitrogen System (Theoret. Chim. Acta. 10, 222 (1968).
2. Discovery of an Electron Transfer Reaction (and the solvent effect) of a biological model compound, Pyridinyl Radical. (Work with Professor E.M. Kosower, *J Am. Chem. Soc.* 90, 71 (1968).
3. Developed Independently the use of Storage Oscilloscope in high speed cyclic Voltammetry (1968) at Stony Brook and approximate method for the evaluation of $t_{1/2}$ for unstable species generated at the electrode (1969-1970~ Stony Brook).
4. Use of Nicholson-Shain equation for the Evaluation of Rate Constant of a Chemical Reaction Proceeded by Reversible Electron Transfer (*Anal. Chem.* 47, 958 (1975).
5. Establishment of Criteria for an Electron Transfer Reaction (*J. Am. Chem. Soc.*) 93, 2713 (1971), *J. Chem. Soc. (London) Perkin II*. No.6, 1975,526.
6. Studies in the field of Dianion ("Super Reactive" Intermediates) Chemistry with Prof. Szwarc, *JAC.S.* 98, 1461 (1976) and other works vis. *Aust. J. Chem.* 27,2495 (1974), *Electro. Chim. Acta*, 22, 487 (1977) *J Chem. Soc. (Pak)* 3,103 (1981) etc.
7. Questioned and Investigated the Mechanism of a Single Step Two-Electron Transfer and proposed alternative route (*Electrochim. Acta*), 22, 487 (1977), *J. Chem. Soc. (Pakistan)*, 3, 103 (1981).
8. Development of Line-Shape Technique and Evaluation of E^0 (*Anal, Chem.* 49, 60 (1977).
9. Proposed and demonstrated the feasibility of "Stopped - Flow Voltammetry", A unique technique coupling Stopped-Flow and high speed Voltammetry for fast reaction studies (*Euroanalysis III*, 1978, *J. Electroanal Chem.* 98,335 (1979).
10. Establishment of Mohammad. Nicholson-Shain method for fast reactions (reaction of free radicals, anion radicals and dianions etc.) (*J. Electroanal*

- Chem* 89, 431 (1978), *J. Phys. Chem.* 85, 2816 (1981), *J. Electroanal. Chem.* 124, 139 (1981).
11. Proposed the Mediation Properties of Higher (Reduction) Products e.g. Pyridinyl Anion, 1,1'-dimethyl, 4,4'-bipyridyl (diradical ?) etc. *J. Am. Chem. Soc.* 100, 7658 (1978), *J. Electroanal. Chem.* 124, (1981), *J. Phys. Chem.* 85, 2816 (1981).
 12. Independent work on Cyclic Voltammetry in two Dimensions (thin film) (Microchemical Symposium, Austria (1980).
 13. Proposed a new method for the Evaluation of the Solvation Free Energies of Transfer. The Pyridinium Iodide method (*J. Electrochem. Soc. (India)*, 30,204 (1981).
 14. Proposed the (quantum mechanical) basis for Distinction in Charge Transfer Complex and an Intimate Ion Pair, and Evaluation of Equilibrium Constant for (the equilibrium between) a Charge - transfer Complex and Intimate Ion Pair (*J. Chem. Soc. (Pak)*, 10 (1988), 71.
 15. Questioned the Existence of a Charge Transfer Complex in Biological System (International Symposium on Bioelectrochemistry and Bioenergetics, Nottingham, August 1983.
 16. Proposed and demonstrated the feasibility of "Ultrasonic Voltammetry". A unique technique coupling ultrasonics and high speed voltammetry (International Symposium on Microchemical Techniques. W. Germany Aug. 28 - Sept. 1, 1989 Accepted for presentation).
 17. Preparation of an important class of redox compound: Methyl Viologen Neutral (*Org. Chem.* 53 (1987) 2779.
 18. Demonstrated the catalytic reduction of carbon dioxide by Methyl Viologen cation radical (*J. Electrochem. Soc. (India)*, 36 (1988), 75). The work is of significance in the context of the Green House effect.
 19. Developed a method for the determination of electron affinities of charged species (*Bull. Electrochem.* 4 (1989), 287.
 20. Proposed replacement of barium by magnesium in the high T_c Superconductor. The magnesium containing superconductor ceramic with high T_c was made by our group then.
 21. Used polarography in the trace elements analysis of sea water in 1960 (M.Sc. thesis, University of Karachi). This was the first time polarography was used in chemical oceanography.
 22. Considered as one of the Founders of Pyridinyl Radical chemistry.
 23. Developed an equation to predict a superconductor's T_c for 1-2-3-ceramics, *Collect. Czech. Chem. Comm.* (accepted).
 24. Co discoverer of Na-doped Y-Ba-Cu-O ceramic with zero resistance near/at room temperature (High T_c Update 6,11 June 1, 1992). *Mater. Sci. Lett.*, 12,814 (1993).
 25. Developed a generalized equation for ac-conductivity for polycrystalline solids (*J. Electrochem. Soc. Ind.* 1999).
 26. A pioneer work on electrochemical impedance spectroscopy of superconducting ceramics (Second International Symposium on EIS, Santa Barbara, California - (1992).

27. Co discoverer of cytotoxicity of paraquat towards cancer cells (Reported in 9th National Chemistry Conference, Karachi 1998).
28. Developed a method of evaluation of reversible $E_{1/2}$ of O_2^-/O_2 couple in methanol, ethanol and water through the use of Mohammad-Nicholson-Shain method and Z-value- $E_{1/2}$ relationship (O_2^- is unstable in these solvents, undergoing EC reaction).
29. A pioneer work on EIS on ultra microelectrode (J. Electrochemical Soc. Ind. 49 (1), 2001).

5 Topmost Publications

For an author/research worker it is always difficult to categories his/her publication as excellent/good/fair etc..Can a mother tell whom of her children she loves most?

Any way as per advice here are "5 topmost" publication of mine.

- a. M. Mohammad, "Cyclic Voltammetric Investigation of a Chemical Reaction Preceded by a Reversible Charge Transfer: Reaction of Pyridinyl Radical with 4 nitro benzyl Chloride", *Anal. Chem.*, **47**, 958 (1975). This is about Mohammad-Nicholson Shain method.
- b. M. Mohammad and M. Razaq, "Stopped-Flow Voltammetry". The paper was accepted for presentation in ERROANALYSIS III, Conference, Ireland 1978. (Abst 242-p). Extended work published in *J. Electro Anal. Chem.* **98**, (2), 235 (1979). A unique combination of Voltammetry and Stopped-flow technique
- c. M. Mohammad, A Y. Khan, M. Iqbal, R Iqbal and M. Razaq, "Pyridinyl Radicals, Pyridinyl Anion. Z-values", *J. Am. Chem. Soc.*, **100**, 7658 (1978).A paper in JACS from Chem.. Dept QAU !!
- d. M. Mohammad, "Methyl Viologen Neutral", *J. Org. Chem.*, **53**, 2779(1987).(This paper declared as Scholarly Paper in 2006 www.google.com.pk/search?hl=en&q=J.+Phys.+Chem.+Vol+85+page+28+16)
- e. M. Mohammad, "Ultrasonic Voltammetry", *Bull Electrochem.* **6**, 806 (1990). Again a unique combination - of ultrasound and voltammetry. This field is now termed Sonovoltammetry.

For other important publications see the list of Important Contributions above

