



Prof. DAVID NJOROGE KARIUKI

ADDRESS:

DEPARTMENT OF CHEMISTRY UNIVERSITY OF NAIROBI,
P. O. BOX 30197, GPO 00100 NAIROBI
Telephone (office) :+254-20-4449004 ext. 2167
Telephone (mobile): 254-722-261554
E-mail: dkariuki@uonbi.ac.ke OR kariukidn@yahoo.com

UNIVERSITIES AND SCHOOLS ATTENDED:

1972-1975: University of East Anglia, Norwich, England.
1969-1972: University of Nairobi.
1967-1968: Alliance High School.
1963-1966: Kirangari High School.
1955-1962: Kirangari Primary and Kirangari Intermediate Schools.

DEGREE QUALIFICATIONS

1975: Doctor of Philosophy in Chemistry, Department of Theoretical and Inorganic Chemistry, School of Chemical Sciences, University of East Anglia, Norwich England.
Title of Ph.D. Dissertation:
"Some Aspects of Vibrational Spectra of Mixed Crystals of Metal Carbonyls".

AREAS OF CONCENTRATION

Coordination and Organometallic Chemistry, Theoretical Chemistry (group theory, quantum chemistry) & Vibrational Spectroscopy (infrared and Raman).

PRIZE AWARDS:

1. 1971/72 Kenya Shell Prize
2. 1971/72 Gandhi Smarak Prize
(Both prizes awarded for the best final year student in the Faculty of Science).
3. Hylleraas award; awarded after attending the 1977 International Summer Institute in Quantum Chemistry and Solid State Physics, University of Uppsala, Sweden.

WORK EXPERIENCE:

1997 - 2001 Chairman, Department of Chemistry
1988-Present: Associate Professor, Department of Chemistry, University of Nairobi.
1980-1988: Senior Lecturer, Department of Chemistry, University of Nairobi.
1975-1980: Lecturer, Department of Chemistry, University of Nairobi.
1973-1975: Part-time demonstrator and tutor, Department of Theoretical and Inorganic Chemistry, University of East Anglia, Norwich.

1972: Taught Chemistry and Mathematics ('A' level) at Kianyaga Secondary School for four months after B Sc. degree.

1969-1972: Worked as research assistant at E.A.A.F.R.O., Muguga, during the long vacations.

1969: Taught Physical Science and Mathematics at Kinyogori High School for nine months.

DEPARTMENTAL AND FACULTY RESPONSIBILITIES

1. Head of inorganic and analytical section, Department of Chemistry, 1978 - 1997
2. Chairman, technical and related matters sub-committee of the Department of Chemistry, 1978 - 1997.
3. In charge of course registration of students in the Department of Chemistry 1978-1994.
4. Member, CICU sub-committee.
5. Lecturer in charge of chemistry departmental reading room-cum-library, 1980 - 1997.
6. Acting Chairman of the Department of Chemistry on several occasions.

EXTERNAL EXAMINER APPOINTMENTS:

1. School of Environmental Studies, Moi University 1995-1997, 2003 - to date.
2. Chemistry Department, Egerton University 1991-1993.
3. Chemistry Department, University of Zimbabwe 1989-1992.
4. Chemistry Department, Kenya Science Teachers College, 1984, 1988-1990, 1995, 1996
5. Applied Science Department, Kenya Polytechnic 1990-1995.

OTHER APPOINTMENTS:

- 1 Chairman, Chemistry panel, Kenya National Examinations Council, 1989 to date
2. Moderator for K.C.S.E. (8.4.4) Chemistry Examination papers 233/1A, 233/1B and 234/2, 1989 to date
3. Examiner in Charge for Advanced level Chemistry paper one 1980 -1988
4. Setter of K.A.C.E. Chemistry Examination Papers 1,2, and 3, 1979-1988.
5. Setter of K.C.S.E. Chemistry Examination Papers 232/2 and 234/3b 1989 to date.
6. Judge at National Students Science Congress 1977-1989. Appointed the Chief Judge in 1990.

MEMBERSHIP

1. Kenya Chemical Society
2. National Chemistry Panel, K.I.E., 1980 - 1997.
3. Kirangari High School Board of Governors 1976-1996.
4. Secretary to Parent's Teacher's Association, Executive Committee, Alliance High School 1995-1998.

RESEARCH INTERESTS:

1. The vibrational spectra of coordination and organometallic compounds
2. Quantitative analysis of various anions e.g. fluoride, chloride, nitrate/nitrite, carbonates using ion selective electrodes and colorimetric methods.
3. Analysis of heavy metals in the environment e.g. rivers, lakes, sludge and foods using atomic absorption, UV/visible and X-ray fluorescence spectroscopic methods.
- 4 Utilization of mineral resources e.g. manufacture of sodium hydroxide and sodium bicarbonate from sodium carbonate using precipitation and/or electrolytic methods.
5. Preparation and characterization of nickel (III) and copper (III) biureto complexes.
6. Recovery of silver metal from used photographic films.
7. Formulations using essential oils.

UNDERGRADUATE PROJECTS

1. Polymorphism of calcium carbonate. By Ochieng, F.C.D. 1978. Supervisors: Dr. Molepo and Prof. D.N. Kariuki.
2. Analysis of aluminium in baby foods and in tea using atomic absorption spectroscopy. By Too Charles Cheruiyot, 1990. Supervisor: Prof D.N. Kariuki
3. The quantitative anion analysis of Lake Bogoria waters. By Bwogo, R.K.B. 1980. Supervisor: Prof. D.N. Kariuki.
4. Quantitative analysis of Zinc, Lead, Cadmium, Copper and Mercury in human head hair by the use of atomic absorption spectrophotometer. By Njenga, K.W. 1980. Supervisors: Prof. S.O. Wandiga and Prof. D.N. Kariuki.
5. Production and methods of increasing sodium chloride in lake liquor. By Njenga, L.W. (Miss) 1981. Supervisor: Prof. D.N. Kariuki.
6. The study of the infra red spectra of organometallic complexes of iron and molybdenum. By Gachanjah, A. Ngure. 1981. Supervisor: Prof. D.N. Kariuki.
7. Determination of heavy metal content in eyeliners By Otieno, T. 1986. Supervisor: Prof. D.N. Kariuki.
8. The production of sodium hydrogen carbonate from Magadi Soda. By Chepkwony, J.K. 1987. Supervisor: Prof. D.N. Kariuki.
9. The determination of chloride and fluoride in water using spectrophotometric methods. By Kagunya W.W. 1989. Supervisor by Prof. D.N. Kariuki.
10. Analysis of aluminium in baby foods and in tea using atomic absorption spectroscopy. By Too Charles Cheruiyot. 1990. Supervisor: Prof. D.N. Kariuki.
11. Chemical analysis of cigarette smoke. By Jane Mumbi. 1990. Supervisor: Prof. D.N. Kariuki.
12. Studies in variation of viscosity with temperature of some esters and engines oils. By Theuri, C.M. 1990. Supervisors: Prof. D.N. Kariuki and Dr. N. Desai.
13. Analysis of fluoride ion concentration in locally manufactured fruit juices. By Muchoki, Mwangi, B. 1990. Supervisors: Prof. D.N. Kariuki and Dr. L.W. Njenga.
14. Determination of fluoride in alkaline water using ion selective electrode. By Miya, G.H. 1991. Supervisors: Dr. L.W. Njenga and Prof. D.N. Kariuki.
15. Recovery of silver from used medical X-ray films. By Eliud O. Oloo 1994. Supervisor Prof. D.N. Kariuki .
16. A source of chemistry practicals for schools. By Mutaaga, W.G. 1995. Supervisor: Prof. D.N. Kariuki.
17. Determination of total alkalinity in Magadi soda ash. By Mbugua, N.L. 1997. Supervisor: Prof. D.N. Kariuki.
18. Mineral nutritional contents of Lake Elementaita shore sand to grazing animals. By Kotonya J. 1997. Supervisors: Prof. D.N. Kariuki and Mr. D.K. Kariuki.
19. Lead concentration in roadside soils in Westlands Area, Nairobi. By Musila, S.K. 1998. Supervisor: Prof. D.N. Kariuki.
20. Silver Recovery from used photographic X-ray films and conversion to silver nitrate. By Wagura K.S.. 1999. Supervisor: Prof. D.N. Kariuki
21. Recovery of silver from photographic films. By Rimu M.T., 1999. Supervisor: Prof. D.N. Kariuki.
22. Analysis of Nairobi Dam water. By Mwangi, M.S. 2000. Supervisors Prof. D.N. Kariuki and Dr. D.K. Kariuki. Formulations using chamazulene oil. By J. Manono, 2001. Supervisors Prof. D.N. Kariuki and Ms. L. Kerubo.
23. Pilot plant for recovery of silver from used x-ray films and conversion to silver nitrate, in progress.

THESIS PUBLICATIONS-POSTGRADUATE STUDENTS:

Ph D

1. Gathu Nyaga, "Extraction and high pressure liquid chromatographic determination of atrazine, pyrazon and simazine in water and soil", 1983.
2. Njenga, L. W., "Methods for fluoride analysis in plants, foods, and soil using fluoride ion selective electrode", 1989.
3. Kariuki D.K., "Assessment of Selenium Status in Livestock from Koibatek District, Kenya" 2000
4. Kahama, R. W., "Analysis of fluoride in Human and cow milk samples" 2001

M Sc

1. Njenga, L.W., "Determination of Fluoride in water and tea using ion selective electrode and colorimetric methods", 1982.
2. Hoene, N.A., "Determination of tin and lead in canned foodstuffs by spectroscopic methods", 1983.
3. Maina, D.M., "Heavy metal analysis of sewage sludge by X-ray fluorescence technique and the environmental implications" 1984.
4. Nyanzi, S.A.M., "Determination of nitrate and nitrite content in potable water and baby foods in Kenya", 1985.
5. Njagi, F.M., "Infra-red spectra of substituted carbonyls of iron and group six metals", 1986.
6. Mwangi, E.M., "Chemical analysis of lead in eye cosmetics and in scalp hair samples", 1989.
7. Barua, E. N., "Uptake of heavy metals by vegetables grown on sewage sludge amended soils", 1989.
8. Kamugi, N.P.V., "Investigating into the effects of pH on the availability of trace elements in soil", 1990.
9. Kariuki, D.K., "A case study for the manufacture of sodium hydrogen carbonate", 1990.

BOOK PUBLICATIONS

1. Explore Chemistry, Form 3, D.N. Kariuki, P.M.Chege and A.M.Ngei. First Published 2004, Longman Kenya.
2. Explore Chemistry, Form 2, D.N. Kariuki, P.M.Chege and A.M.Ngei. First Published 2003, Longman Kenya.
3. Explore Chemistry, Form 1, D.N. Kariuki, J.Kithinji, P.M.Chege and A.M.Ngei. First Published 2003, Longman Kenya.
4. Explore Chemistry, Form 4, D.N. Kariuki and P.M.Chege, Publishers Longman Kenya, In print to be published November 2005

CHAPTER CONTRIBUTION

Development of New Products: International - University - Industry Cooperation: Camomile Project

Bojana Boh, David N. Kariuki, Aleksandra Kornhauser, Jacob O. Midiwo, Shem O. Wandiga
University Industry Government Cooperation 'How to make it work?

Teaching/Learning manual based on examples of good practice in research, teaching and management from Chemistry and related disciplines.

UNESCO - ICCS Ljubljana, Editor Aleksandra Kornhauser, 2001

RESEARCH PUBLICATIONS:

1. "The Raman Spectra of mixed crystals of metal carbonyls in the 2000 cm⁻¹ region" D. N. Kariuki and S.F.A. Kettle, *Journal of Organometallic Chemistry*, 105 209 (1976).
2. "Vibrational Spectra of molecular crystals of impure metal carbonyls". D.N. Kariuki and S.F.A. Kettle, & Ti Soi Sang, Paper presented at the XVII International Conference on Coordination Chemistry, Hamburg, German, 1976.
3. "The vibrational Spectra of mixed crystals of (C₆H₅)₃PMxM₁- x(CO)₅, where M, M = Cr, Mo, W.". D. N. Kariuki and S.F.A. Kettle, *Journal of Raman Spectroscopy*, 6, 319 (1977).
4. "Raman Spectra of mixed crystals of transition metal hexacarbonyls", D.N. Kariuki and S.F.A. Kettle, *Inorganic Chemistry*", 17 141 (1978)
5. "Vibrational Spectra of mixed isotopic crystals of manganese and rhenium pentacarbonyl iodides", D.N. Kariuki and S.F.A. Kettle, *Inorganic Chemistry*, 17 1018 (1978).
6. "The vibrational Spectra of mixed crystals of tricarbonyl- (mesitylene)- chromium, molybdenum, and tungsten in the 2000 cm⁻¹ region", D.N. Kariuki and S.F.A. Kettle, *Journal of Chemical Society (Dalton)* 3 262 (1978).
7. "Mixed crystal and ¹³CO isotopic studies on intermolecular vibrational coupling in the δ (CO) region of M₂(CO)₁₀, M = Re, Mn.", M. Arif, A. M. Cartner, D.N. Kariuki and S. F.A. Kettle, *Journal of Chemical Physics*, 70 1031-9 (1979).
8. "The vibrational spectra in the 2000 cm⁻¹ region of mixed and isotopic crystals of manganese and rhenium pentacarbonyl chlorides and bromides", D.N. Kariuki and S. F.A. Kettle, *Spectrochim. Acta, Part A*, 34A 563-76 (1978).
9. "Production of salt at Lake Magadi and possible improvements", D.N. Kariuki, A.H.S. Elbusaidy, M. Molepo and H.M. Thairu, report submitted to Magadi Soda Co., April, 1979.
10. "The development of the Solar Industry in Kenya", D.C. Munasighe, A.H.S. Elbusaidy, D.N. Kariuki and N.B. Macharia, A technical report to ISPC, Ministry of Commerce and Industry, June 1979.
11. "The distribution of fluoride in Kenya waters", H.M. Thairu, D.N. Kariuki & L.W. Njenga, *Proceedings of the Environmental Chemistry Sub-region Workshop, National University of Lesotho, Roma*, 32-6 (1982).
12. "Dietary sources of fluoride in Kenya", D.N. Kariuki, H.M. Thairu & L.W. Njenga, 'Fluorosis Research Strategies', *Proceedings of a workshop held in Nairobi, Kenya*; S. Likimani, (Ed.) , 32-6 (1983).
13. "Analysis of fluoride ion in potable water using colorimetric and electrochemical methods", D.N. Kariuki, H.M.Thairu & L.W. Njenga, Final report submitted to the National Council for Science and Technology, 1984.
14. "Accumulation of Fluoride by Plants and Vegetables", L.W. Njenga and D.N. Kariuki, *International Journal of BioChemPhysics*, 3 (1), 170 (1994).
15. "Comparison of two microdiffusion methods used to measure ionizable fluoride in cow's milk", R.W. Kahama, D.N. Kariuki & L.W. Njenga, *Analyst*, 120, 2245 (1995).
16. "A rapid method for the determination of selenium in animals' blood at nanogram level", D.K. Kariuki and D.N. Kariuki, *Proceedings of second International Conference of the Kenya Chemical Society*, 72 (1996).
17. "Fluorosis in children and sources of fluoride around Lake Elementaita Region of Kenya" R.W. Kahama, D.N.Kariuki, H.N. Kariuki, & L. W. Njenga, *Fluoride*, 30 (1), 19 (1997).

18. "Effect of interfering ions on hexamethyldisiloxane microdiffusion method", R.W. Kahama, D.N. Kariuki & L.W. Njenga, *Talanta*, 44 (1997) 1729-1733.
19. "Use of Whole Blood in the Assessment of Selenium in Kenya's Livestock", Kariuki, D.K. and Kariuki, D.N., *Proceedings of 3rd International Conference of Kenya Chemical Society*, August 1999.
20. "Heavy metal Determination in Kenya's waters, - A Review", Kariuki, D.N., Kariuki, D.K. *3rd International Conference of Kenya Chemical Society*, August 1999.
21. "The Potential of *Matricaria Chamomilla* L as a commercial plant in semi-arid areas of Kenya", Kerubo L, Midiwo, J.O. and Kariuki, D.N. *3rd International Conference of Kenya Chemical Society*, August 1999.
22. "The concept of Hybridisation", Kariuki, D.N., *4th Theoretical Chemistry Workshop in Africa and East and Southern Africa Environmental Chemistry and Applied Chemical Technology*, May 2001.
23. "Analysis of fluoride in locally available beverages: Comparison of direct, oven diffusion and hexamethyldisiloxane diffusion methods". L.W. Njenga and D.N. Kariuki, *International Journal of BioChemPhysics*, 13: 30 -35, 2004.
24. "Selenium status of livestock in Koibatek District, Kenya". Kariuki D. K. and Kariuki D. N. *International Journal of BioChemPhysics*, 13 (2): 66 -69, 2004
25. "Water labile fluoride in fresh raw vegetable juices from markets in Nairobi, Kenya". L.W.Njenga, D.N. Kariuki and S.M. Ndegwa. *Fluoride* 2005; 38(3): 177-180.