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Biography of Distinguished Professor Eno E. Ebenso

Background, Personal Life and Discoveries

Professor Eno Ebenso was born on 18th November, 1964 to the family of Effiong Moses and Affiong Moses Ebenso. He is a Chemist of international repute with about 200 journal publications with about 14,000 Google scholar citation index with h-index of 65 and i10-index of 246 and about 5500 total citations from the Scopus search Engine of Elsevier Science since 1996. According to the Elsevier SciVal Insights Report (2010-2015). He has a citation impact 10% above world average. He is one of the global shakers in the field of corrosion inhibition Chemistry worldwide. According to Scopus, he is currently 2nd most prolific author in the field of corrosion inhibition and fifth most downloads of his publications globally in the field of corrosion inhibition. In 2010, his article was one of the top 10 most downloaded in the Green Chemistry Letters and Reviews. His research over the years have focused on Electrochemistry, kinetics, adsorption, thermodynamics of corrosion. He has carried out extensive researches on corrosion inhibition in different media using electrochemical, weight loss, hydrogen evolution and thermometric methods. Synergistic and antagonistic studies. Plant extracts, polymers and synthetic organic and inorganic compounds are used as inhibitors. Colloids and Surface Chemistry (Naturally occurring colloids-exudates gums). He has also been involved in Quantum chemical / molecular modeling and theoretical studies of compounds used for corrosion inhibition studies using density functional theory (DFT) and other semi-empirical methods. Some of his discoveries and fundamental results include but not limited to:

- Transformation of oil-derived olefinic compounds (oleochemicals), using olefin metathesis reaction, to fine chemicals and intermediates with potential application in the manufacturing of various niche/strategic market materials such as pharmaceuticals, detergents and polymers (polyesters, polyamides, polyethers, polyurethanes).
- Proposing a mechanism of chemical adsorption of the plants components on the surface of the metal.
- Using silica from RHA as a raw material for biodiesel production. First of its kind!

Edited and Communicated by:
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1. Education

He attended the University of Calabar, Nigeria where he graduated with Bachelor of Science in Chemistry (Second Class Upper Division) and carried out his undergraduate research project on; the determination of the degree of association of Organic acids in Benzene and carbon tetrachloride in 1986. He moved to the prestigious University of Ibadan to obtain a Masters degree in Physical Chemistry where his dissertation focused on the; Kinetics of oxidation of N, N‘ - diphenyl-p-phenylene diamine in perchloric acid solution in 1990. Eno Ebenso returned to his alma-mater to study for a Doctor of Philosophy (Ph.D.) in Physical Chemistry and his dissertation focused on the Investigation of thin films of some deposited transition metal Oxides and perovskites using nebulized spray pyrolysis technique in 2002.

2. Academic Career

Professor Eno Ebenso started his career as a Teaching Assistant at the University of Ibadan, Nigeria from 1988 till 1989. He transferred his services to the Department of Pure & Applied Chemistry, University of Calabar, Nigeria, where he was appointed Assistant Lecturer in 1990, he held this position till 1993. In the same year he grew to the rank of a Lecturer II till 1997. He went on to become a Senior Lecturer in 2001. Eno Ebenso was appointed Post-Doctoral Fellow in 2005 at the Institute of Materials Research, Darmstadt University of Technology, Darmstadt, Germany. He also went on to carry out research on Giant Magneto resistance and Spintronic materials at the Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bangalore, India, a position he held till 2006. In the same year, he went on Sabbatical Leave in the Department of Chemistry, University of Uyo, Uyo, Nigeria. In 2008, he was appointed Professor by the same department. Eno Ebenso transferred his services to the Department of Chemistry and Chemical Technology, National University of Lesotho, Lesotho, Southern Africa in 2007.

In 2009, he was appointed Professor by the Department of Chemistry, North-West University, South Africa. Professor Eno E. Ebenso is a Chemist of international repute with about 200 journal publications with about 14,000 Google scholar citation index with h-index of 65 and i10-index of 246 and about 5500 total citations from the Scopus search Engine of Elsevier Science since 1996. According to the Elsevier SciVal Insights Report (2010-2015). He has a citation impact 10% above world average. He is one of the global shakers in the field of corrosion inhibition Chemistry worldwide. According to Scopus, he is currently 2nd most prolific author in the field of corrosion inhibition and fifth most downloads of his publications globally in the field of corrosion inhibition. In 2010, his article was one of the top 10 most downloaded in the Green Chemistry Letters and Reviews.

3. Administrative Life

Professor Eno Ebenso held several administrative positions in the University of Calabar, Nigeria. He was a member of University senate, National University of Lesotho etc. He was appointed subject Chair, Department of Chemistry, North-West University, Mmabatho, South Africa in 2009, he held this position till March, 2011. On March, 2011, Eno Ebenso moved on to become the director, School of Mathematical and Physical Sciences North West University, South Africa, he held this position till September 2012. Professor Eno became the executive Dean, Faculty of Agriculture, Science & Technology, North West University, South Africa from October, 2012 till date.

Professor Eno Ebenso is a member of many committees in North-West University, South Africa: Member, Institutional Research Support Commission, Member, Extended Campus Management Committee, Member, Senate, Faculty EXCO, Faculty of Agriculture, Science and Technology, Member, Technical Reviewer, National Research Foundation Programme (South Africa) - Rating and Research Proposal Funding, Member, Faculty Yearly Research Day Committee, Faculty of Agriculture, Science and Technology,Member (Institutional) , Higher Education Qualification Framework (HEQF) Committee - Cluster Coordinator, Life and Physical Sciences, Group Leader, Scarce Skills Development Plan Funding from department of Higher Education and Training (DHET), Life and Physical Sciences Category, Faculty of Agriculture, Science and Technology.

4. Teaching and Mentoring

Professor Eno has taught many courses/Modules at Undergraduate and Postgraduate Levels amongst others are; Group theory and Symmetry, Physical Chemistry courses, Statistical & Chemical Thermodynamics, Electrochemistry, Atomic, Molecular structure & Symmetry, Chemistry of Crystals and Macro molecules, Theory of Molecular Spectroscopy, Quantum Chemistry, Colloid and surface Chemistry, Solid State Chemistry, Chemical Physics and Statistical/ Quantum Mechanics, Chemical Kinetics, Introduction to Catalysis. He has also been involved Organising practicals, teaching and supervision of research projects for undergraduate and postgraduate students (MSc and PhD).

Eno Ebenso has successfully supervised more than ten (10) PhDs but recently three (3) (S. A. Umoren, O. Abakedi and N.O. Eddy) from the University of Calabar , Nigeria and two (2) (Brighton Kaonga and Priya Thomas) from the North-West University and two (2) MSc (S. Adediran and E. Ating) from the University of Calabar , Nigeria and Chester Murulana from the North-West University students thesis. He is currently supervising 3 PhD students in Chemistry department in NWU, South Africa; four (4) MSc students in Chemistry and one (1) MSc student in Environmental Sciences. He is also involved in collaborative research with some professors and research groups in the

following universities and institutes; University of Uyo, University of Port-Harcourt , Federal University of Technology (FUTO), Owerri, all in Nigeria. Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore 560064, India (Chemistry and Physics of Materials Research Group), Institute of Organic Chemistry and Biochemistry, Universitat des Saarlandes, D-66041, Saarbrucken, Germany and Institute of Materials Research, Darmstadt University of Technology, D-64287, Darmstadt, Germany (Research on Giant Magneto resistance and Spintronic materials), Department of Chemistry, Kocaeli University, 41380, Izmit, Turkey. Department of Chemistry, Osmangazi University, 41380, EskiÅekir, Turkey, Department of Science and Technology Education, Faculty of Education, Cukurova University, 01338 Adana, Turkey. Department of Physics, Cukurova University, 01338 Adana, Turkey.

He has also won research grants from the National Research Foundation (NRF) of South Africa, scientific research committee of turkey, third world academy of sciences (TWAS) and the German academic exchange service (DAAD).

5. Research Interest

His research over the years have focused on Electrochemistry, kinetics, adsorption, thermodynamics of corrosion. He has carried out extensive researches on corrosion inhibition in different media using electrochemical, weight loss, hydrogen evolution and thermometric methods. Synergistic and antagonistic studies. Plant extracts, polymers and synthetic organic and inorganic compounds are used as inhibitors. Colloids and Surface Chemistry (Naturally occurring colloids-exudates gums). He has also been involved in Quantum chemical / molecular modeling and theoretical studies of compounds used for corrosion inhibition studies using density functional theory (DFT) and other semi-empirical methods.

Professor Ebenso has also studied Chemistry and Physics of Materials. Novel Aspects of solid state Chemistry and material science majoring in thin film deposition using nebulized spray pyrolysis and characterization using XRD, EDAX, SEM, resistivity, magnetization and magneto resistance studies of manganates, cobaltates and double perovskites. Crystallization kinetics of the thin films.Use of ionic liquids as corrosion inhibitors. ResearchGate currently credits him with 223 Research items, 30, 203 Reads and 7,091 citations.

He also developed and pioneered a new area of study; Thermodynamics and excess molar volumes studies of solutions. In collaboration with Professors Marvey and Vosloo, he conducted a study on Olefin Metathesis Technology and Catalyst Design: Transformation of oil-derived olefinic compounds (oleochemicals), using olefin metathesis reaction, to fine chemicals and intermediates with potential application in the manufacturing of various niche/strategic market materials such as pharmaceuticals, detergents and polymers (polyesters, polyamides, polyethers, polyurethanes). Such molecular transformations require the use of transition metal catalysts like those based on Re, W, Ru, and Mo and as such development of highly active, selective and stable olefin metathesis catalysts forms the fundamental part of this research. Comparison of the reactions in conventional solvents and ionic liquids.

His article published by Corosion Science (Elsevier Publishing) titled “Inhibitory action of phyllanthusamarus extracts on the corrosion of mild steel in acidic media”, is a citation classic with more than 500 citations. This article written in collaboration with P. C. Okafor , M. E. Ikpi , I. E. Uwaha, U. J. Ekpe and S. A. Umoren. In this study, they investigated the inhibitive action of leaves (LV), seeds (SD) and a combination of leaves and seeds (LVSD) extracts of Phyllanthusamarus on mild steel corrosion in HCl and H2SO4 solutions using weight loss and gasometric techniques. The results from the study indicates that the extracts functioned as a good inhibitor in both environments and inhibition efficiency increased with extracts concentration. Temperature studies revealed that an increase in inhibition efficiency with rise in temperature and activation energies decreased in the presence of the extract. A mechanism of chemical adsorption of the plants components on the surface of the metal was proposed for the inhibition behaviour. The adsorption characteristics of the inhibitor were approximated by Temkin isotherm.

6. Textbooks written by Prof. Ebenso

- An Introduction to Physical Chemistry (1999). Ed. by U. J. Ekpe. Contributors: U. J. Ekpe, E. E. Ebenso, I. E. Uwah and B. I. Ita. Printed by Zubicksgift, Lagos, Nigeria.

- From Dust to Dust: The Chemistry Alternative (2011) An INAUGURAL LECTURE by Prof. Eno E. Ebenso presented at the North-West University (Mafikeng Campus) , South Africa on the 19th of April, 2011. ISBN 978-0-9869966-1-0.

- An Evaluation of Atmospheric Aerosols in Kanana, Klerksdorp Gold Mining Town, North-West Province of South Africa by B. Kaonga and E.E. Ebenso. Book Chapter in Air Quality Monitoring, Assessment and Management edited by Nicolas A. Mazzeo (2011) Part 2, Chapter 14; pages 285 -304. Intech Open Access Publishers, Croatia. Publication Date: July 2011. ISBN 978-953-307-317-0. (378 pages).

7. Scholarships, Grants & Prize

- Federal Government of Nigeria Postgraduate Studies Scholarship Award (1990). M.Sc. in Chemistry – University of Ibadan – Nigeria.
- Best All-round student of the Year Prize (1980/81) at Hope Waddell Training Institute, Calabar, Nigeria.
- Best Mathematics students Prize (1980/81) at Hope Waddell Training Institute, Calabar, Nigeria.
- Most Productive Senior Researcher in 2010 - North West University, South Africa.
- Most Internationally Cited Researcher (2010) in the North West University – Certificate and Plaque of Recognition.
- International Leadership in Research (2011) in the North -West University – Certificate of Recognition.

8. Positions held

- Third World Academy of Sciences (TWAS) South-South Fellowship Award (Jan. 1999 – August 1999) at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore 560064, INDIA.
- Deutscher Akademischer Austauchdienst (DAAD) (German Academic Exchange Service) – Short Term Research Fellowship (Oct. 1999 – March 2000) at Universitat des Saarlandes, D-66041 Saarbruecken, GERMANY.
- Deutscher Akademischer Austauchdienst (DAAD) (German Academic Exchange Service) – Short Term Research Fellowship (Aug. 2006 – Oct. 2006) at Technical Universitat des Darmstadt, Germany.
- Visiting Scientist Fellowship (2008 till date) Scientific Research Programme Fellowship of Turkey (TUBITAK) tenable at the Department of Chemistry, Kocaeli University, 41380, Izmit, Turkey.

9. Memberships in Learned Societies

- Member, Chemical Society of Nigeria (MCSN).
- Member, American Chemical Society (MACS).
- Member, New York Academy of Sciences.
- Member, National Geographical Society.
- Member, NACE, International Corrosion Society.
- Member, Nigerian Corrosion Society.
- Member, Soc. for the Adv. of Electrochemical Science & Technology (SAEST).
- Member, Chemical Society of Ethiopia.
- Member, International Association of Physical Chemists.
- Member, International Society of Electrochemistry.

- Member, South African Chemical Institute (M.S.A. Chem. I.).
- Member, South African Council for Natural Scientific Professions (SACNASP) (Pri. Sci. Nat).
- Fellow, Royal Society of Chemistry, UK (FRSC).

10. Editorial Activities

- Reviewer, Global Journal of Pure and Applied Sciences (NIGERIA).
- Reviewer, Journal of Applied Polymer Sciences (WILEY-INTERSCIENCE, USA).
- Reviewer, Materials Chemistry and Physics (ELSEVIER, Holland etc).
- Reviewer, Journal of Chemical Society of NIGERIA.
- Reviewer, Pigment and Resin Technology (EMERALDINSIGHT, UK).
- Reviewer, International Journal of Applied Chemistry (RPI, India).
- Reviewer, Chemical Engineering Communications, UK
- Reviewer, Bulletin of Chemical Society of Ethiopia.
- Reviewer, African Journal of Pure and Applied Chemistry.
- Reviewer, Portugaliae Electrochimica Acta.
- Reviewer, Corrosion Science (ELSEVIER, Holland).
- Reviewer, Journal of Applied Electrochemistry (WILEY-INTERSCIENCE, USA).
- Reviewer, African Journal of Agricultural Research.
- Reviewer, Scientific Research and Essays.
- Reviewer, International Journal of Electrochemical Science.
- Reviewer, Chemical Transactions.
- Reviewer, Journal of Molecular Modeling (WILEY-INTERSCIENCE, USA).
- Reviewer, Molecular Simulation-Journal of Experimental Nanoscience.
- Reviewer, International Journal of Quantum Chemistry (WILEY-INTERSCIENCE, USA).
- Reviewer, Journal of Advanced Studies (ELSEVIER, Holland etc).
- Reviewer, Arabian Journal of Chemistry (ELSEVIER, Holland etc).
- Reviewer, Arabian Journal of Science and Technology.
- Reviewer, International Journal of Electrochemistry.
- Reviewer, Solid State Electrochemistry.
- Reviewer, International Journal of Corrosion.
- Reviewer, IONICS.
- Reviewer, Research on Chemical Intermediates.

- Reviewer, International Journal of Hydrogen Energy.
- Member, Editorial board, Recent Patents on Corrosion Science.
- Member, Editorial board, Journal of Materials and Environmental Science.
- Member, Editorial board, International Journal of Materials and Chemistry.
- Member, Editorial board, Journal of Chemica Acta.
- Member, Editorial board, Advances in Materials and Corrosion.
- Member, Editorial board, Journal of Applied Chemistry.
- Member, Editorial board, Journal of Theoretical Chemistry.
- Member, Editorial board, Der Pharma Chemica- Online Journal of Medicinal, Pharmaceutical and Computational chemistry.
- Executive Editor , Achieves of Applied Science Research (an international peer reviewed journal of applied sciences).
- Editor in Chief - International Journal of Waste Water Treatment and Green Chemistry.