

# CURRICULUM VITAE

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**NAME: KIPYEGON KOECH RICHARD**

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## Personal Information

- Nationality: Kenyan
- ID No: 23656091
- Gender: Male
- Date of birth: Dec 23<sup>rd</sup>, 1983
- Marital Status: Married
- Religion: Christian
- Language: English and Kiswahili



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## Academic Background

**2018 - 2022: AFRICAN UNIVERSITY OF SCIENCE AND TECHNOLOGY:** Doctor of philosophy in Material Science and Engineering (Energy)

**Thesis Title:** Additives effects on the charge carrier dynamics and performance metrics of Formamidinium-rich mixed lead halide perovskite solar cell

**Supervisors:** Prof Esidor Ntsoenzok and Prof Wole Soboyejo

**2019 – 2021: WORCESTER POLYTECHNIC INSTITUTE:**

Visiting Research Scholar: Research on perovskite solar cells

**2009 - 2012: CHEPKOILEL UNIVERSITY COLLEGE (CURRENTLY UNIVERSITY OF ELDORET):** Master of Science in physics (Renewable energy option)

**Thesis Title:** A parametric study of a thermosiphon photovoltaic/thermal air system

**Supervisors:** Prof Joel Tonui and Prof Samwel Rotich

**2004 - 2008: EGERTON UNIVERSITY:** Bachelor of Education (Science)

- Obtained first Class Honors

**1999 - 2002: GORGOR HIGH SCHOOL:** Kenya Certificate of Secondary Education (KCSE).

- Obtained A- (Minus)

**1991 - 1998: GORGOR PRIMARY SCHOOL:** Kenya Certificate of Primary Education (KCPE).

- Obtained 455 out of 700

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## Computer Proficiency:

**Basic Packages:** Introduction MS-Windows, Microsoft office: MS-Word, MS-Excel, Access, internet and Power point, Acrobat reader, Linux among others.

**Programming Language:** Fortran, MATLAB and Python

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**Career Objective**

- To fully engage my professional resourcefulness in setting desirable standards geared towards the realization of both broad and specific objectives within my field of practice and employment.
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**Other qualifications**

- 17<sup>th</sup> - 20<sup>th</sup>, October 2022: DSI-NRF-CNRS Workshop on research for impact- strengthening scientific collaboration between Africa and Europe, Future Africa Campus, Pretoria.
  - 18<sup>th</sup> - 20<sup>th</sup>, August 2021: RSIF Training workshop: Information Literacy and Reference Management, Organized by RSIF-Regional Coordination Unit-ICIPE
  - 5<sup>th</sup> -9<sup>th</sup>, July 2021: Scientific paper writing and publishing workshop, organized by APHRC and ICIPE
  - 18<sup>th</sup> - 20<sup>th</sup> August 2021: RSIF Information Literacy Training
  - 19<sup>th</sup>, May 2021: Laboratory safety training organized by Worcester Polytechnic Institute (WPI)
  - 7<sup>th</sup> May 2021: Making the most out of science direct (Elsevier) including research workflow management
  - 19<sup>th</sup>-20<sup>th</sup> May 2021: Technical Monitoring and evaluation organized by ICIPE
  - 16<sup>th</sup>-20<sup>th</sup> November 2020: Research Methods and Statistics, data management and analysis organized by ICIPE
  - 12<sup>th</sup>-13<sup>th</sup> November,2020: Scientific Communication: presentation, posters and pitching organized by ICIPE
  - 23<sup>rd</sup>-24<sup>th</sup> September 2020: Monitoring and Evaluation organized by ICIPE
  - 7<sup>th</sup> -13<sup>th</sup> July, 2020: SDGs, Learning, training and practice workshop: Hosted by UNITAR and the Division for Sustainable Development Goals, at the United Nations Department of Economic and Social Affairs.
  - 1<sup>st</sup> & 3<sup>rd</sup>, June 2020: Author Workshop: Article and Book publishing Process, A webinar organized by Elsevier Africa.
  - 17<sup>th</sup> - 28<sup>th</sup>, June 2019: Participated in entrepreneurship Boot camp held in African University of Science and Technology, Abuja-Nigeria.
  - 25<sup>th</sup>, June, 2020: Workshop on plagiarism: Decision making and dealing with grey zone across academic fields; webinar organized by Elsevier Africa.
  - 1<sup>st</sup> & 3<sup>rd</sup> June, 2020: Author Workshop: Article and Book publishing Process, A webinar organized by Elsevier Africa.
  - 10<sup>th</sup> – 20<sup>th</sup>, December 2018: Attended a workshop on sustainable energy materials held in Kampala in Uganda organized by JUAMI.
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- 20<sup>th</sup> – 24<sup>th</sup>, August 2018: Participated in the Pan African School of Materials (PASMATV) Workshop.
- 21<sup>st</sup>, June 2018: 2018 Special Materials Lecture. **Theme:** Development of secondary raw materials for global competitiveness held at Raw Materials Research and Development Council (RMRDC) Auditorium, Maitama, Abuja.

Work Experience	Period	Institution	Position
	Aug 2014- Date	Moi University	Lecturer
	2011-Aug 2014	Mt. Kenya University	Part-time lecturer
	June 2011-Aug 2014	Romosha Sec. Sch.	Teacher (Maths & Physics)
	Sept 2010-June 2011	Gorgor Sec. Sch.	Teacher (Maths & Physics)

- Published Book Chapters**
- Oluwaseun K. Oyewole, Omolara V.O yelade, Reysya Ichwani, Richard Koech, Deborah O. Oyewole, Jaya Cromwell, Yusuf Olanrewaju, Winston O. Soboyejo (2022): Mechanical Properties of Solar Cell Structures
  - Oluwaseun K.Oyewole, Sharafadeen A. Adeniji, Deborah O. Oyewole, **Richard Koech**, Omolara V. Oyelade, Jaya Cromwell, Yusuf Olanrewaju, Abdulhakeem Bello, Winston O.Soboyejo: Fatigue of Flexible and Stretchable Electronic Structures
  - Abdulhakeem Bello, Ridwan A. Ahmed, **Richard. K. Koech**, Kingsley Orisekeh Dahiru M.Sanni, Moses Kigozi, Vitalis Anye, Oluwaseun K. Oyewole, Winston O. Soboyejo (2022). The Mechanical Properties of Batteries and Supercapacitors

- Publications**
- Yusuf A. Olanrewaju, **Richard K. Koech**, Omolara V. Oyelade, Ridwan A. Ahmed, Reysya Ichwani, Abraham I. Ebunu, Jaya Cromwell, Abdulhakeem Bello, Vitalis C. Anye, Oluwaseun K. Oyewole, and Winston O. Soboyejo (2022): Thermally induced failure mechanisms in double and triple cations perovskite solar cells, *AIP Advances*, 12, 085014
  - **Richard K. Koech**, Yusuf A. Olanrewaju, Reysya Ichwani, M. Kigozi, Deborah O. Oyewole, Omolara V. Oyelade, Dahiru M Sanni, Sharafadeen A. Adeniji, Erika Colin Ulloa, Lyubov V. Titova, Julia L. Martin, Ronald L. Grimm, Abdulhakeem Bello, Oluwaseun K. Oyewole, Esidor Ntsoenzok and Winston O. Soboyejo (2022): Effects of Polyethylene Oxide Polymer on the photo-physical properties and operational stability of FA-Rich perovskite solar cells, *Scientific Report*, 12, 12860
  - R. Ichwani, V. Uzonwanne, A. Huda, **R. Koech**, O. K. Oyewole and W. O. Soboyejo (2022): Adhesion in perovskite solar cell multilayer structures, *ACS Applied Energy Materials*, 5, 5, 6011–6018
  - Jaya Cromwell, Sharafadeen Adeniji, Deborah Oyewole, **Richard**

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**Koech**, Reisya Ichwani, Benjamin Agyei-Tuffour, Oluwaseun Oyewole, and Winston Soboyejo (2022). Effects of Blister Formation on the Degradation of Organic Light Emitting Devices, *AIP Advances*, 12, 035308

- Omolara Oyelade, Oluwaseun Oyewole, Yusuf Olanrewaju, Reisya Ichwani, **Richard Koech**, Deborah Oyewole, Sharafadeen Adeniji, Dahiru Sanni, Jaya Cromwell, Ridwan Ahmed, Kingsley Orisekeh, Vitalis Anye, and Winston Soboyejo (2022): Understanding the Effects of Annealing Temperature on the Mechanical Properties of Layers in FAI-Rich Perovskite Solar Cells, *AIP advances*, 12, 025104
- Yusuf Olanrewaju, Kingsley Orisekeh, Omolara Oyelade, **Richard Koech**, Reisya Ichwani, Abraham Ebunu, Daniel Amune, Abdulhakeem Bello, Vitalis Anye, Oluwaseun Oyewole, and Winston Soboyejo (2022): Effects of Temperature-Dependent Burn-In Decay on the Performance of Triple Cation Mixed Halide Perovskite Solar Cells, *AIP advances*, 12, 015122
- Reisya Ichwani; **Richard Koech**; Oluwaseun Kehinde Oyewole; Adri Huda; Deborah Olubunmi Oyewole; Jaya Cromwell; Julia L Martin; Ronald L Grimm (2022). Interfacial Fracture of Hybrid Organic-Inorganic Perovskite Solar Cells; *extreme mechanics letters*, Vol. 50, 101515
- **Richard K. Koech**; Reisya Ichwani; Deborah O. Oyewole; Moses Kigozi; Daniel Amune; Dahiru Sanni; Sharafadeen A. Adeniji; Oluwaseun K. Oyewole; Abdulhakeem Bello; Esidor Ntsoenzok; Winston Soboyejo (2021): Tin Oxide modified Titanium Dioxide as Electron Transport Layer in Formamidinium-Rich Perovskite Solar Cells, *Energies*, 14(23), 7870;
- **Richard K. Koech**, Reisya Ichwani, Julia L. Martin, Deborah O. Oyewole, Omolara V. Oyelade, Yusuf A. Olanrewaju, Dahiru M Sanni, Sharafadeen A. Adeniji, Ronald L. Grimm, Abdulhakeem Bello, Oluwaseun K. Oyewole, Esidor Ntsoenzok and Winston O. Soboyejo (2021): A Study of the Effects of a Thermally Evaporated nanoscale CsBr layer on the Optoelectronic Properties and Stability of Formamidinium-rich Perovskite Solar Cells, *AIP Advances*, 11, 095112
- Sharafadeen Adeniji, Oluwaseun Oyewole, **Richard Koech**, Deborah Oyewole, Jaya Cromwell, Ridwan Ahmed, Omolara Oyelade, Dahiru Sanni, Kingsley Orisekeh, Abdulhakeem Bello, Winston Soboyejo (2021). Failure Mechanisms of Stretchable Perovskite Light-Emitting Devices under Monotonic and Cyclic Deformations, *Journal Macromolecular Materials and Engineering*, 305 (30).
- D. O. Oyewole, **R. K. Koech**, Reisya Ichwani, Juan Hinostroza Tamayo Sharafadeen Adetunji Adeniji, Jaya Cromwell, Oluwaseun Kehinde Oyewole, Benjamin Agyei-Tuffour, Lyubov Titova, Nancy A. Burnham, Winston O Soboyejo (2021): Annealing Effects on the Interdiffusion in Layered in FA-Rich Perovskite Solar Cells, *AIP Advances*, 11, 065327
- Dahiru Sanni, Aditya Yerramilli, Esidor Ntsoenzok, Sharafadeen Adeniji, Omolara Oyelade, **Richard Koech**, Adebayo A Fashina, and Terry L. Alford (2021). Impact of precursor concentration on the properties of

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perovskite solar cells obtained from the dehydrated lead acetate precursors, *Journal of Vacuum Science and Technology*, 39, 032801

- S. A. Adeniji, J. Cromwell, D. O. Oyewole, O. V. Oyelade, **R. K. Koech**, D. M. Sanni, O. K. Oyewole, B. Babatope, W. O. Soboyejo (2021): Pressure-assisted fabrication of perovskite light emitting devices, *AIP Advances*, 11, 025112
- Dahiru Sanni, Esidor Ntsoenzok, Eddy Saintaimé, Sharafadeen Adeniji, Omolara Oyelade, **Richard Koech**, Daniel Amune, and Abdulkakeem Bello (2020): The role of hafnium acetylacetonate buffer layer on the performance of lead halide perovskite solar cells derived from dehydrated lead acetate as Pb source, *AIP Advances*, 10, 075006
- O. K. Oyewole, D. O. Oyewole, O. V. Oyelade, S. A. Adeniji, **R. K. Koech**, J. Asare, B. Agyei-Tuffour and W. O. Soboyejo (2020): Failure of Stretchable Organic Solar Cells Under Monotonic and Cyclic Loading, *Journal Macromolecular Materials and Engineering*, 305 (30).
- Kigozi Moses, **Richard K Koech**, Orisekeh Kingsley, Itohan Ojeaga, Tebandeke Emmanuel, Kasozi Gabriel and Peter A Onwualu (2020): Synthesis and characterization of graphene oxide from locally mined graphite flakes and its supercapacitor applications, *Results in Materials*, 7, 100113
- Abdulkakeem Bello, Dahiru Sanni, Sharafadeen Adeniyi, Victalis Anye, Kingsley Orisekeh, Moses Kigozi, **Richard Koech** (2020): Combustion synthesis of battery-type positive electrodes for robust aqueous Hybrid supercapacitor, *Journal of Energy storage*, 27, 101160.
- **R. K. Koech**, J. K Tonui, R. O Nyayieka & P. K. Macharia (2017): Assessment of the efficacy and impacts of Agrochemical and Food Company Ltd's wastewater treatment plant on the quality of water in the river Nyando, Kenya, *IJWR* 7(2), pp 48-52
- **R. K. Koech** (2016): Effects of thermal resistance of encapsulation material on the performance of a single pass PV/T Air system, *IJTRD*, Vol. 3, Issue 6
- G. K. Yegon<sup>1</sup>, G. K. Arusei<sup>2</sup>, **R. K. Koech**<sup>3</sup> (2015): MOSFET Scaling to Sub-Micron Range; Analysis of Characteristic Curves in Relation to Device Parameters. *IJETAE*: Vol. 5, Issue 5, Pp. 500-503
- **R. K. Koech**, G.K Arusei, G. K. Yegon, J.K Tonui, S. K Rotich (2014): Photovoltaic/ Thermal (PV/T) System as Innovative Solution to increase Solar energy conversion efficiency. *IJETAE*: Vol. 4, Issue 10, pp 717-722.
- Ondieki H. O., **Koech R. K.**, Tonui J. K., Rotich S. K. (2014). Mathematical Modeling of Solar Air Collector with a Trapezoidal Corrugated Absorber Plate. *IJSTR*: Vol. 3, Issue 8.
- G.K Arusei, G.K Yegon, S.K. Rotich, R.K. Nixon, **R.K. Koech** and D.K Choge (2013): Elastic scattering reaction of  $^4\text{He} + ^{10}\text{B}$  matrix, differential cross-section and reaction cross-section at laboratory energies of 5-15 MeV; an optical model analysis on partial wave scattering, *APTA*: Vol.23, pp. 11-18

- **R. K. Koech**, H. O Ondieki, J. K. Tonui, S. K Rotich (2012): A steady state thermal model for photovoltaic/thermal (PV/T) system under various conditions, *IJSTR*: Vol. 1, Issue 11.
- **R. K. Koech**, H. O Ondieki, J. K. Tonui, S. K Rotich (2012): Performance Analysis of a PV/T Air system based on heat transfer perspective, *IJSER*: Vol. 3, Issue 10.

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### Conferences Attended

- 20<sup>th</sup> – 23<sup>rd</sup>, June 2022: RSIF conference:  
**Theme:** Power Economics and Energy Innovation in Africa, Bengueri, Morocco  
**Title of paper:** Effects of PEO on the photophysical properties of perovskite solar cells  
**Science slam:** Perovskite solar cells: A paradigm shift in photovoltaics
- 20<sup>th</sup> – 23<sup>rd</sup>, August 2019: IEEE PES/IAS Power Africa Conference:  
**Theme:** Power Economics and Energy Innovation in Africa.  
**Title of paper:** Recent advances in solar energy harvesting materials with particular emphasis on photovoltaic materials.
- 12<sup>th</sup> – 16<sup>th</sup>, November 2018: 17<sup>th</sup> Annual International Conference of the Materials Science and Technology Society of Nigeria (MSN).  
**Theme:** Towards successful implementation of economic Recovery and Growth Plan: The Role of Secondary Raw Materials Development held at RMRDC Auditorium, Maitama, Abuja
- 10<sup>th</sup>, July 2018: National Technical Conference & Induction.  
**Theme:** Cost engineering, Engineering Economy and Engineering valuation perspectives on sustainable engineering infrastructure for accelerated rural development organized by the Institute of Appraisers and Cost Engineers held at Symposium Hall, Maitama, Abuja
- 14<sup>th</sup>-15<sup>th</sup> June 2012: RVTTI 3<sup>rd</sup> Annual Conference.  
**Theme:** Advances and challenges in the realization of millennium development goals.  
**Title of paper:** A steady state thermal model for photovoltaic/thermal (PV/T) system under various conditions.
- 6<sup>th</sup>-10<sup>th</sup>, September 2011: Moi University International Annual Conference.  
**Theme:** Achieving environmental Sustainability and Economic Development: *Global warming and climate change*.  
**Title of the paper-** Parametric Studies of PV/T Solar Air Collector under Natural Flow Mode

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### Funded Research

- Water quality assessment along the river Nyando in the vicinity of ACFC Ltd in Muhoroni, Funded by Moi University- VLIR-UOS
- Renewable energy project, Funded by world bank through ACE
- JIRA grant: Funded by PASET-RSIF

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### Membership to Professional

- Member of Africa Materials Research Society (AMRS).
  - Member of Institute of Electrical and Electronic Engineers (IEEE)
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**Bodies**

- Member of International Society for Development and Sustainability (ISDS)
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**Community Service**

- BOM member: Gorgor Secondary School
  - BOM member: Kipsingei Secondary School
- 

**REFEREES****1. Prof. P.A Onwualu**

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**2. Prof. S.K Rotich**

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**3. Prof. J.K Tonui**

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