

## African University of Science and Technology, Abuja, Nigeria AUST



- Pan-African University, established in 2007 in Abuja, Nigeria, by Nelson Mandela Institution
- Currently Postgraduate institution, has hosted Students from 19 African Countries
- **Disciplines:**
  - ✓ Computer Science, Information Technology
  - ✓ **Material Science & Engineering**
  - ✓ Petroleum Engineering
  - ✓ Pure & Applied Mathematics
  - ✓ Mathematical Modelling, Applied Statistics
  - ✓ Theoretical & Applied Physics, Space Physics
  - ✓ Aerospace Engineering
  - ✓ Systems Engineering
  - ✓ GIS and Geoinformatics
  - ✓ Public Policy, Public Administration

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## AUST-PASET PHD PROGRAMME: MATERIALS SCIENCE AND ENGINEERING (1)

- PhD in Materials Science and Engineering (with option in Mining and Minerals Processing Engineering)
- Admission requirements include: Bachelors Degree in any engineering field or Physical Sciences with minimum of second class upper, 3 points on a 4 point scale, Masters degree in the same fields with minimum of 3.25 on a 4 point scale.
- The programme is run for 3-4 years, depending on the candidates background
- One year is spent at host institution (AUST), followed by one year at partner institution and then one more year at AUST
- The programme starts with course work - minimum of 4 Advanced Courses at PhD level including Research Methods and Technical Writing, plus some MSc courses depending on students bachelors degree. The student must pass the courses at minimum of B-level

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## AUST-PASET PHD PROGRAMME: MATERIALS SCIENCE AND ENGINEERING (2)

- After course work, the student takes PhD Qualifying Examination which includes a written examination plus an oral presentation of PhD Proposal.
- The research is supervised by a PhD Guidance Committee approved by the university Academic Committee, made up of two supervisors (one from AUST and one from partner institution) and 2-3 other Committee members who can be selected from any institution.
- To qualify for graduation, the student must have spent three years and published at least two papers in a SCOPUS indexed journal.
- The Dissertation is examined in a defense by a PhD examination committee approved by the University Academic Committee and made up of the Head of Department as Chair, one faculty from the department, one faculty from the AUST system, at least two others from outside the AUST system and an external examiner.

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### RESEARCH FOCUS: PAN AFRICAN MATERIALS INSTITUTE (PAMI) - AFRICAN CENTRE OF EXCELLENCE (ACE I) – 4 RESEARCH GROUPS ADDRESSING AFRICA'S INFRASTRUCTURE CHALLENGES

- ❑ **Materials for Healthcare** (cancer and cardiovascular diseases detection and treatment using nanotechnology, 3D Printing and robotics approach to COVID PPE production and disease diagnosis, tissue engineering, orthopaedic implants)
- ❑ **Materials for Energy** (renewable energy, biofuels, solar cells, energy storage, batteries)
- ❑ **Multifunctional Materials** (water purification, building and construction materials, natural fibres, biomass valorization, waste management, coatings, corrosion of oil and gas pipelines and storage systems)
- ❑ **Mining and Minerals Processing** (mineral beneficiation and processing to different products, value addition to minerals)

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## AUST FACULTY

- Professor Azikiwe Peter Onwualu
- Dr. Vitalis Anye (Assistant Professor)
- Dr. Abduhakeem Bello (Assistant Professor)
- Dr. Rajesh Prasad (Associate Professor)
- Dr. Alphaes Igbokoyi (Associate Professor)
- Dr. Anatole Kenfack (Associate Professor)
- Visiting Faculty from partner institutions (12# - 6 Professors, 3 Associate Professors, 3 Assistant Professors)

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## PASET SCHOLARS AT AUST

### OPTIMIZATION OF MINERAL BIOPROCESSING AND NANO-BASED STRATEGIES FOR NIGERIAN BARITE BENEFICIATION FOR UTILIZATION IN OIL DRILLING MUD AND OTHER INDUSTRIAL APPLICATIONS David Oluwasegun Afolayan (Nigeria)

- Develop and fabricate a cheap, easy-to-use mineral jig for local processing of barite
- Develop physical and environment-friendly method to recover barite, increase the Specific gravity, and make it suitable for drilling mud application
- Quantify heavy metal contamination in mine water and effluents due to barite mining, assess hazards, and develop methods to reduce its effect on miners and the mining community



- Cheaper design. It cost \$400 & \$600-\$1000 as compared to designs in market, cost ≥ \$1500

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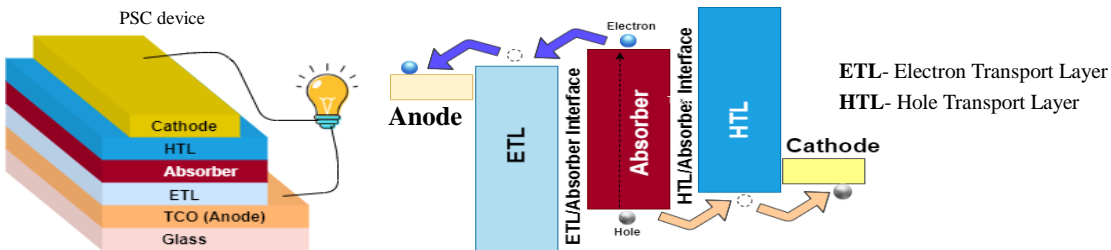
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## DOPING EFFECTS ON THE CHARGE TRANSPORT KINETICS AND PERFORMANCE METRICS OF FORMAMIDINIUM-RICH LEAD HALIDE PEROVSKITE SOLAR CELLS (Richard Koech, Kenya)

- ❑ **Project 1:** Tin oxide ( $\text{SnO}_2$ ) is doped into titanium dioxide ( $\text{TiO}_2$ ) ETL to improve its electron transport properties and power conversion efficiency of perovskite solar cell
- ❑ **Project 2:** Absorber layer is modified with CsBr to improve its optoelectronic properties & long-term stability of perovskite solar cell
- ❑ **Project 3:** Doping the absorber layer with polyethylene oxide (PEO) polymer to engineer the stretchability of the overall PSC device



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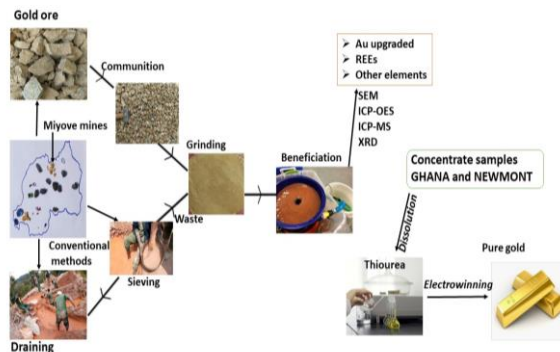
## PASET SCHOLARS AT AUST

### GEOMETALLURGICAL STUDIES OF SELECTED GOLD ORES WITH THE APPLICATION OF ENVIRONMENTALLY FRIENDLY LIXIVIANTS

**Jeanne Pauline Munganyinka (Rwanda)**

#### OBJECTIVES

- To use an environmentally friendly leaching reagent to recover the fine gold particles
- Characterize and beneficiate gold ores from different locations
- Review and assess the different factors affecting gold extraction process



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# OPTIMIZATION OF TANTALUM RECOVERY FROM TYPICAL RWANDAN AND NIGERIAN TANTALITE ORES (HABINSHITU JEAN BAPTISTE, RWANDA)

The main objective of this study is to develop a simpler and eco-friendly alternative approach for optimum recovery of tantalum from its ores of different mineralogies.

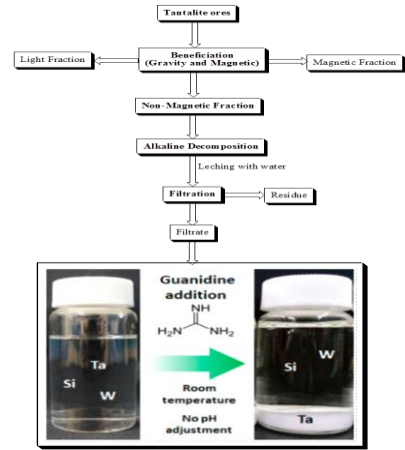
**Project-I:** Characterize tantalite ore-samples collected from different areas in Rwanda.

**Project-II:** There are promising results of alkaline conversion of Ta/Nb concentrates into water-soluble compounds which can be easily leached (**ongoing**)

**Project-III:** Successful precipitation of Nb from solution containing other metals using guanidine

**Project-IV:** Simulation of the tantalum-niobium recovery process

The envisage method is expected to overcome environmental and cost challenges related to the production of tantalum either from primary or secondary sources.



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## Direct Financial support to icipe from:-



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# THANK YOU

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For more information contact

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