MAPRONANO ACE

Africa Center of Excellence in Materials, Product Development and Nanotechnology

MAKERERE UNIVERSITY

MAPRONANO ACE COMMISSIONING OF THE VP SIGMA 300 ELECTRON MICROSCOPE AT THE DEPARTMENT OF MECHANICAL ENGINEERING, COLLEGE OF ENGINEERING, DESIGN, ART & TECHNOLOGY (CEDAT) ON WEDNESDAY 21ST JULY 2021 AT 2:00PM

Brief Description of Center: The Center was developed out of the need to strengthen research and training in the thematic areas of materials science and engineering, nanotechnology and nanomedicine in order to develop human resource capacity in applied science engineering disciplines for the development of the great lakes region.

VP Sigma 300 Scanning Electron Microscope Equipment:

MAPRONANO ACE has acquired a state of the art Vapour Pressure (VP) Sigma 300 High resolution Scanning Electron Microscope for nanomaterial's characterization, Materials sciences research and all Nano scale related fields. This is the first of its kind Equipment in Sub-Saharan Africa for nanotechnology research. The VP Sigma 300 Scanning Electron Microscopy will be used by the faculty at the Department of Mechanical Engineering and College of Health Sciences and other University colleges for the below applications:

- Minerals identification, size measurements of micron and nanosized materials
- Determining the morphology of biological specimens (structural biology), nanoparticle analysis and detection, drug research (testing new vaccines and medicines)
- Drug discovery and identification of new pathogens (Viruses, bacteria & fungi)
- Tissue imaging such as Cancer Imaging, device testing and characterization, pharmaceutical quality control, forensic science, toxins identification.
- Determining the crystallographic structure of specimens (topology, morphology and composition),
- Materials science research, detection/ elemental analysis and cathodolumines cence microscopy (CL)
- Quality control and failure analysis, reliable performance of semiconductors
- Effectiveness of new production and fabrication methods

The Equipment will also be accessible to industry and regional partners. Training opportunities in advanced microscopy techniques, nano-materials characterization will also be offered to graduate, industry professionals and regional students. Below some of the applied research projects that will use the Equipment:

1) Synthesis of lipid and chitosan nanoparticles for vaccine/drug delivery systems: The Equipment will be used for determining the morphological characteristics of the green synthesized lipid and chitosan nanoparticles before the Covid vaccine delivery system is developed.

2) Synthesis and characterization of graphene from Coffee husks: The size, number of concentric graphene layers, number of sphere and nano-structure of the graphite derived nanomaterials will be determined by the purchased VP Sigma Scanning Electron Microscopy

3) Characterize silver and copper nanoparticles derived from plant extracts: The particle size and microstructure will be studied by high resolution scanning electron microscopy (SEM). The VP sigma SEM Equipment will be used to characterize the size and shape of the nanoparticles

4) Green synthesis of graphene for energy storage.

ACE II

Eastern and southern africa higher education centers of excellence project

IUCEA

THE WORLD BANK

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