

## African Advanced Energy Materials Research & Development

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Advanced Energy Materials research is focussed on the design, fabrication, characterisation and theoretical understanding of materials that have use in energy generation, storage and distribution applications. An energy revolution is currently underway as governments worldwide seek to reduce dependence on fossil fuels and transition to a low carbon energy supply. Achieving this will require the development of cost-effective innovation in energy technologies.

Africa faces numerous challenges to generate and distribute an adequate supply clean energy that is required to maintain infrastructure including transportation, communication, industry, education, security and healthcare. Energy security is vital for a robust and sustainable economy. There is great potential to develop new materials for generating and harvesting energy from renewable sources including photovoltaic devices and mechanical energy recouperation devices that can enable low-cost and innovative renewable sources of energy while eliminating negative effects on the environment that are inherent when non-renewable sources of energy are utilised.

Synchrotron light sources are bright terrestrial sources of light ranging from extreme X-rays to infra-red and are enabling tools for probing the properties of materials. Light sources underpin innovation in virtually all fields of research and development. Energy materials characterisation with synchrotron x-rays is a vital tool for the development of modern and next generation energy technologies. Africa however is the only habitable continent that does not currently have a synchrotron light source facility. The African Light Source (AfLS) Project is leading the drive towards establishment of the first light source on the African continent.

For Africa to adequately leverage its potential for developing energy technologies and realise the utility of a light source, a coordinated effort between African countries is needed to ensure that a sustained stream of investment is directed towards key strategic domains, as identified by domain experts, and retention of skilled scientists to support the relevant science communities.