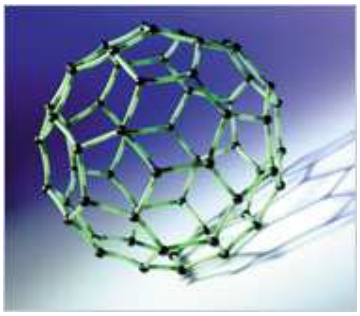
South Africa launches first nanotechnology innovation centres

The Minister of Science and Technology, Mr Mosibudi Mangena at the launch of the CSIR's National Centre for Nano-structured Materials

The President and CEO of the CSIR, Dr Sibusiso Sibisi, with the Minister of Science and Technology, Mr Mosibudi Mangena, and Dr Suprakas Sinha Ray at the launch of the CSIR's National Centre for Nano-structured Materials



Fullerenes, discovered in 1985 by Robert Curl, Harold Kroto and Richard Smalley at the University of Sussex and Rice University, are a family of carbon allotropes named after Richard Buckminster Fuller. The popular name for these structures is 'buckyballs'. Fuller was a noted architect who popularised the geodesic dome. Since buckminsterfullerenes have a similar shape to that sort of dome, the name was thought to be appropriate.

"South Africa, as a developing nation, has much to benefit from nanotechnology. We therefore have to create an environment conducive to harnessing the potential benefits of this promising field of science." These were the words of Science and Technology Minister, Mr Mosibudi Mangena, at the launch of South Africa's first two national nanotechnology innovation centres. The launch took place at the CSIR in November.

Buckyballs are molecules composed entirely of carbon, in the form of a hollow sphere, ellipsoid, or tube. Cylindrical fullerenes are called carbon nanotubes or buckytubes. Fullerenes are similar in structure to graphite, which is composed of a sheet of linked hexagonal rings, but these also contain pentagonal (or sometimes heptagonal) rings that prevent the sheet from being planar.

The two nanotechnology innovation centres have been established at the CSIR and at Mintek, respectively.

Nanotechnology has taken the world of science by storm since it potentially holds the key to new materials with extraordinary properties. Such materials could lead to the development of new technologies that could revolutionise the quality of life of the citizens of South Africa.

Highly accurate and sensitive medical diagnostic devices, new ways of disease therapy, and the monitoring and remediation of basic water supplies are just a few areas that have been identified where nanoscience and nanotechnology can make an impact.

To ensure that South Africa remains competitive with the international research community in this fast-developing field, the country's nanoscience and nanotechnology effort is being coordinated at national level by the Department of Science and Technology (DST) through its National Nanotechnology Strategy. Activities at these new centres are strongly aligned with this strategy.

Mangena said these centres should take researchers closer to using nanotechnology to address some of South Africa's socio-economic challenges. "Theirs will not be blue sky research but activities with identified, tangible measurables. They will have to be at the forefront, the tone-setters and catalysts of the country's research and development programme in nanotechnology," added the Minister.

The focus of the CSIR-hosted centre, the National Centre for Nano-structured Materials (NCNSM), is on the design, modelling, synthesis, characterisation and fabrication of new and novel nano-structured materials with specific functional properties. The centre at Mintek focuses on water, health, mining and minerals.

These areas have been identified in the National Nanotechnology Strategy as key in the development of nanoscience and nanotechnology in order to effect social development.

Both centres will have a strong focus on human capital development by training and developing young scientists who will stimulate growth in South Africa's emerging nanotechnology industry.

In its first three years, the CSIR-hosted NCNSM will have the following research foci:

- Fabrication of selected novel nano-structured materials for application in solar cells, printed electronic devices, biosensors and nanopolymers
- Synthesis and characterisation of quantum dots with application in medical sensors, solid-state lighting and optical devices
- Synthesis of polymer nanocomposites for a variety of applications
- Synthesis of nano-structured materials for specific energy-related applications

- Materials modelling and simulation with the aim of understanding and predicting the fundamental properties of nanomaterials.

Dr Suprakas Sinha Ray, chief researcher and leader at the NCNSM says, "We are still in the initial wave of nanotechnology, in which most of the nanotechnology-based products on the market are linked to defence and national security applications or to sporting goods and consumer-convenience items.

"Within five to 10 years, sophisticated electronic devices that use nanoscale circuitry and memory can, however, be expected. After 10 to 15 years, the introduction of pharmaceutical products, drug delivery and health-monitoring devices will begin. Beyond the scope of our current conception, perhaps 20 to 30 years ahead, completely new forms of devices and processes will emerge."

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