

Minister Naledi Pandor launches facility for industrial-scale production of nano-structured materials

A facility to produce nano-structured materials for industrial testing was launched at the Council for Scientific and Industrial Research (CSIR) in Pretoria today. It follows earlier successful research and development at laboratory scale.

The state-of-the-art DST-CSIR Nanomaterials Industrial Development Facility was launched by the Department of Science and Technology (DST), in partnership with the CSIR. The facility will help the plastics and cosmetics industries, amongst others, to develop new nanotechnologies and processes.

The facility is part of one of the five programmes funded by DST, through the CSIR, as part of the Industrial Innovation Partnership Fund (IIPF), which seeks to support industry competitiveness. Minister of Science and Technology, Mrs Naledi Pandor says the facility provides the capabilities for the industrial-scale production of nano-structured materials.

“All the facilities supported under the Industry Innovation Programme, including the Nano-materials Industrial Development Facility, have the potential to play a role in the development of high-technology small, medium and micro enterprises. This facility could enable such enterprises to take advantage of the rapidly growing international market in nano-structured materials and nano-composites,” she says.

One of the industries that is set to benefit from the research advances and introduction of an industry-scale testing facility, is the plastics industry. The addition of nanomaterials in the manufacturing of plastics can significantly enhance the mechanical properties of plastics. Plastics can, for example, be made stronger, lighter and more fire and ultraviolet resistant. Addressing the technological development of the plastics industry will enable the industry to keep up with international trends, both in the level of advanced materials used, and in the machines and processes used to produce plastic components and systems.

“Due to the high cost of importing nano-structured materials such as nanoclays, and the absence of local manufacturing capability for these materials, the plastics industry is generally struggling to adopt advanced polymers such as nanocomposites on a large scale. If these challenges are not addressed, there will be continued importation of special polymer

material and products at significant cost and to the detriment of local manufacturers,” says Director at the National Centre for Nanostructured Materials and CSIR chief researcher, Prof. Suprakas Ray.

CSIR Chief Executive Officer, Dr Sibusiso Sibisi says the CSIR performs research to stimulate and improve the competitiveness of industry, and thereby contribute to the economy of the country.

“We need to think differently. We need to explore new ways and mechanisms to enter areas of activities such as the beneficiation of our natural resources to create jobs, manufacture high-end components and export them,” says Sibisi.

The facility houses infrastructure for scale-up, processing and testing. It will also play a crucial role in developing skills and transferring technologies to industry.

“The Nanomaterials Industrial Development Facility provides a platform to train interns, graduates and post-graduate students. These individuals will be equipped with practical skills which will greatly assist their entry into the chemical industry,” says Ray, a world-renowned polymer nanocomposites researcher and technical leader of the programme.

Significant progress towards industry’s development goals has been achieved in the first 18 months of the programme, including the development of four new products and technologies which are currently being evaluated by companies. The four products include two cosmetic products, organically modified South African nanoclay minerals, and polypropylene-based nanocomposites.

The international market in nano-structured materials and nanocomposites is growing rapidly. Nanoclay composites for instance are expected to increase from a 2011 volume of 24, to 74 million metric tonnes and a global value of \$3 billion by 2016. In South Africa, the total plastic consumption is in the order of 1.3 million metric tonnes or R35 billion per annum, and accounts for an estimated 3.2% of the manufacturing sector.

“This facility will allow us to compete internationally in the production of nanoclays, which are nanoparticles of layered mineral silicates, opening up possibilities for a broad range of new products and applications. The programme will facilitate optimisation and scale-up of local industrial processes that employ synthetic nanoclays, potentially reducing the cost

of production and improving quality,” adds Dr Manfred Scriba, programme technologist.

The facility provides a crucial step that is required, namely the transfer of technology from laboratory benches to industry. The facility ensures that the value chain of plastics development is complete by bridging the gap from research to commercialisation. “For a start, this will involve taking processes that produce 200 g samples in the laboratory and scale these up to a production of more than 200 kg, facilitating industrial testing of products and processes,” says Scriba.

About the Industrial Innovation Partnership Fund (IIPF)

The DST’s Industry Innovation Partnership initiative is one of its programmes aimed at innovation-led industrial development and competitiveness. The IIPF programme comprises four programmes, namely, the Biomanufacturing Industry Development Centre (BIDC), the Nanomaterials Industrial Development Facility, the Biorefinery Facility and the Photonics Prototyping Facility. A fifth program at the CSIR is the information, communication and technology Industry Innovation Program. Within two years of inception, the IIPF programme is already yielding tangible outcomes and impact with respect to industry competitiveness, accelerating job creation and leveraging of funding from the industry and public stakeholders. A total leveraged income of R113 million has been secured from the Jobs Fund, Sappi, Denel, and Greenfields Innovation.