

# New membrane cleans acid mine water

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A new technology, developed at the University of Witwatersrand in conjunction with a professor from the US's National Aeronautics and Space Administration (NASA), could be used to clean acid mine water as well as for medical processes such as dialysis.



The research was published last week on *World Water Day* and the SA's *National Water Week*.

Acid mine water - which is contaminated water flowing from metal mines, such as gold mines - causes ecological degradation, and compromises human and animal health. Last year the Mpumalanga town of Carolina lost its municipal water supply when acid mine water polluted the town's dam.

In 2009, the auditor-general estimated the bill for cleaning up existing abandoned mines would top R30bn. Acid mine drainage is found in derelict mines in SA because pumping and water treatment processes cease when the mine closes. According to the Department of Mineral Resources, there are 5,858 derelict and ownerless mines in SA.

"The technology will make it easier to filter pure water from waste produced during mining, oil and gas exploration and production, and nuclear production," Wits University said on Friday (22 March).

The research was headed up by Sunny Iyuke, head of Wits school of chemical and metallurgical engineering, and two doctoral students who were co-supervised by a professor at NASA.

"It is a nanocomposite membrane," Iyuke said, noting that the membrane was made out of carbon nanotubes.

## Nanotechnology

Nanotechnology involves managing and manipulating matter at an atomic level, and deals with structures between one and 100 nanometres.

A nanometre is one billionth of a metre.

In terms of scale, it is the same as comparing a metre to 1-million kilometres - which is more than a return trip to the moon.

"We allow the water to go through the membrane on the one side, rejecting oil and every other contaminant," Iyuke said.

The head of the Nanomaterials Science Research Group at the University of Johannesburg, Bhekie Mamba told *Business Day* last year that a problem with nano-membranes for water purification - something that he is also working on - is that the membranes get clogged with the impurities and have to be cleaned or replaced.

There are a number of technologies being developed to treat acid mine water in SA, such as freezing the water, heating it or chemically processing it.

When asked how this technology was different, Iyuke said: "This membrane makes the process quite easy - you get hold of the polluted water, pass it through the membrane module and then get clean water. Other processes are more expensive," he said.

However, he was unable give any estimate of the costs for the membranes, saying that research was being done into commercial production of the membrane.

He did say that he would not be patenting the technology and it would go directly to the commercialisation phase.

Source: *Business Day* via I-Net Bridge

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