

3D-printed membranes may be future of waste water management

Madhumita Paramanantham

A local start-up has created membranes which it claims can filter waste water five times faster than traditionally used polymer and ceramic membranes.

With the launch of its 3D-printing plant yesterday, the first of its kind in Singapore, Nanyang Technological University's spin-off company Nano Sun will be able to print 600 sq m of these membranes every day – roughly equivalent to the floor space of six four-room HDB flats.

It will take NTU Associate Professor Darren Sun and his 18-member team only four days to produce enough of these membranes to supply an average waste water plant.

While traditional filtration membranes require 13 steps of production, Nano Sun's 3D printer can produce the new membranes in one simple step. The printer is also eco-friendly as the toxic waste water generated during the production

of traditional membranes can be eliminated.

Millions of fibres, each one five times thinner than a strand of hair, can be produced at the 3D printing plant in Tuas every second.

These fibres are put together on a sheet and compressed to form the filtration membrane.

Prof Sun, a co-founder of Nano Sun, said: "Imagine a 3D printer that can print these membranes as easily as you can print a Word document. The process requires 10 times less space and 30 times less manpower when compared to the production of traditional membranes. It's fully automated too."

The emergence of these membranes could allow for the construction of smaller waste water treatment plants, which would lower the costs for land, infrastructure and labour, he added.

Two large semiconductor multinational companies in Singapore and a new waste water treatment plant in China, which can treat up

to 20 million litres of water a day, will be the first customers to use the new membrane.

Nano Sun's managing director and co-founder Wong Ann Chai said he hopes to capitalise on the international demand for industrial waste water treatment. He said: "Most countries don't want to pollute their scarce surface water and underground water resources, which is why we've clinched a record value of contracts this year."

The company has invested about \$6 million in research, product development and hardware for the printing plant.

Prof Sun hopes to one day produce membranes which will facilitate kidney dialysis and even serve as man-made skin.

pmadhu@sph.com.sg



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