

New material cuts waste water treatment costs

By **FENG ZENGKUN**

A CHEMICAL widely used in sunblock and cosmetics could improve Singapore's water industry.

Scientists at Nanyang Technological University (NTU) have developed a new material, made from cheap and abundant titanium dioxide, that can be used to make better water filters. The filters can reduce the energy demand of treating waste water by more than half, and lead to cost savings of more than 30 per cent compared to traditional filters.

Reclaimed water in Singapore, mostly for industrial use, is usually treated by being forced through tiny pores in filters. The larger bacteria in the water are left behind as smaller water particles pass through. As the bacteria accumulate, the filters need to be cleaned regularly or replaced. The titanium dioxide filters can make use of sunlight to break down the bacteria into carbon dioxide, which eliminates the need for maintenance. This process also splits a small amount of water into oxygen and hydrogen, which can be harvested for energy.

The titanium dioxide material can also be used to make better sea-water filters. Sea water is traditionally forced through filters using a high pressure system but this is energy-intensive. An alternative method, known as forward osmosis, uses less energy but does not process water quickly. Titanium dioxide filters allow water to flow through them twice as fast while rejecting contaminants.

The scientists' work on the new sea-water filters was published last month in science journal *Energy and Environmental Science*.

Associate Professor Darren Sun, 52, from NTU's School of Civil and Environmental Engineering, said the team has set up a company to market and further develop the prototypes. "We are in talks with several firms and also with national water agency PUB," he said.

✉ zengkun@sph.com.sg