Source: *The Straits Times,* pA32
Date: 8 December 2018

Turning plastic waste into everyday products

Out of a 100 plastic bottles discarded here, only six are recycled. The rest end up either buried in landfills or as trash on land and sea. A team of National University of Singapore researchers has found a novel way to turn plastic waste into aerogel, which can be used to make practical daily products.

The team, headed by NUS Associate Professor Hai Minh Duong, has developed the world's first polyethylene terephthalate (PET) aerogel that can be developed into products for home, fire-fighting, oil spill and medical uses. Aerogel is not gel but recycled fibres. It is considered the world's lightest solid by Guinness World Records, weighing at 3mg per cm³. It is strong, extremely low density and highly porous.

Associate Professor Hai Minh Duong from NUS Faculty of Engineering.

The invention won first place in the Sustainable Technologies, Create the Future Design International contest this year, beating over 800 entries from 60 countries.

HOW AEROGEL IS MADE

1 Plastic bottles are shredded into fibres using a PET bottle recycling machine

1 plastic bottle

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A4-sized PET aerogel sheet

2 The fibres are put on a pan and chemicals are added. It is then put for 20 mins into a sonar machine that uses sound waves to make it homogenous

3 It is put into a freeze-dryer for at least 8 hours, which freezes the liquid. Water is then removed by vacuum through evaporation

4 Before (left) and after

PET AEROGEL USES

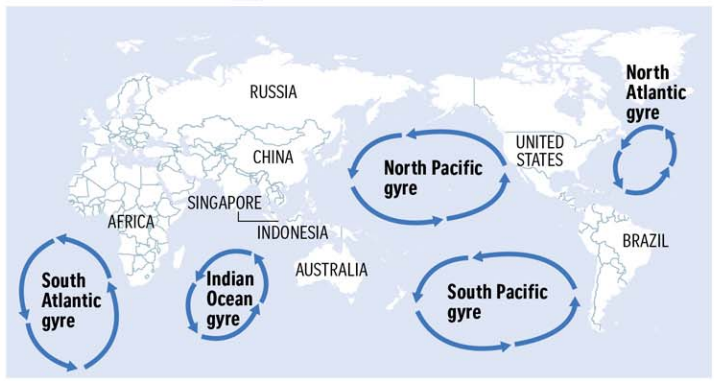
Oil-spill absorbents. Aerogel can be reused over and over again

Thermal and fire-retardant jackets

Heat and sound insulation

FLOATING GARBAGE PATCHES

There are five floating garbage patches all over the world, the biggest being the Great Pacific Garbage Patch which is twice the size of Texas.



BY THE NUMBERS

Singapore threw out

815,200

tonnes of various plastic wastes in 2017 but only

6%

are recycled

1 million

plastic bottles are used per minute

500 billion

plastic bottles estimated to be used yearly by 2021

Source: NATIONAL UNIVERSITY OF SINGAPORE PHOTOS: LEE HUP KHENG, BLOOMBERG, XINHUA, ST FILE STRAITS TIMES GRAPHICS