

# NUS develops way to turn mesh bags into haze-busters

Solution poured onto nets, laundry bags can transform them into PM2.5 air filters

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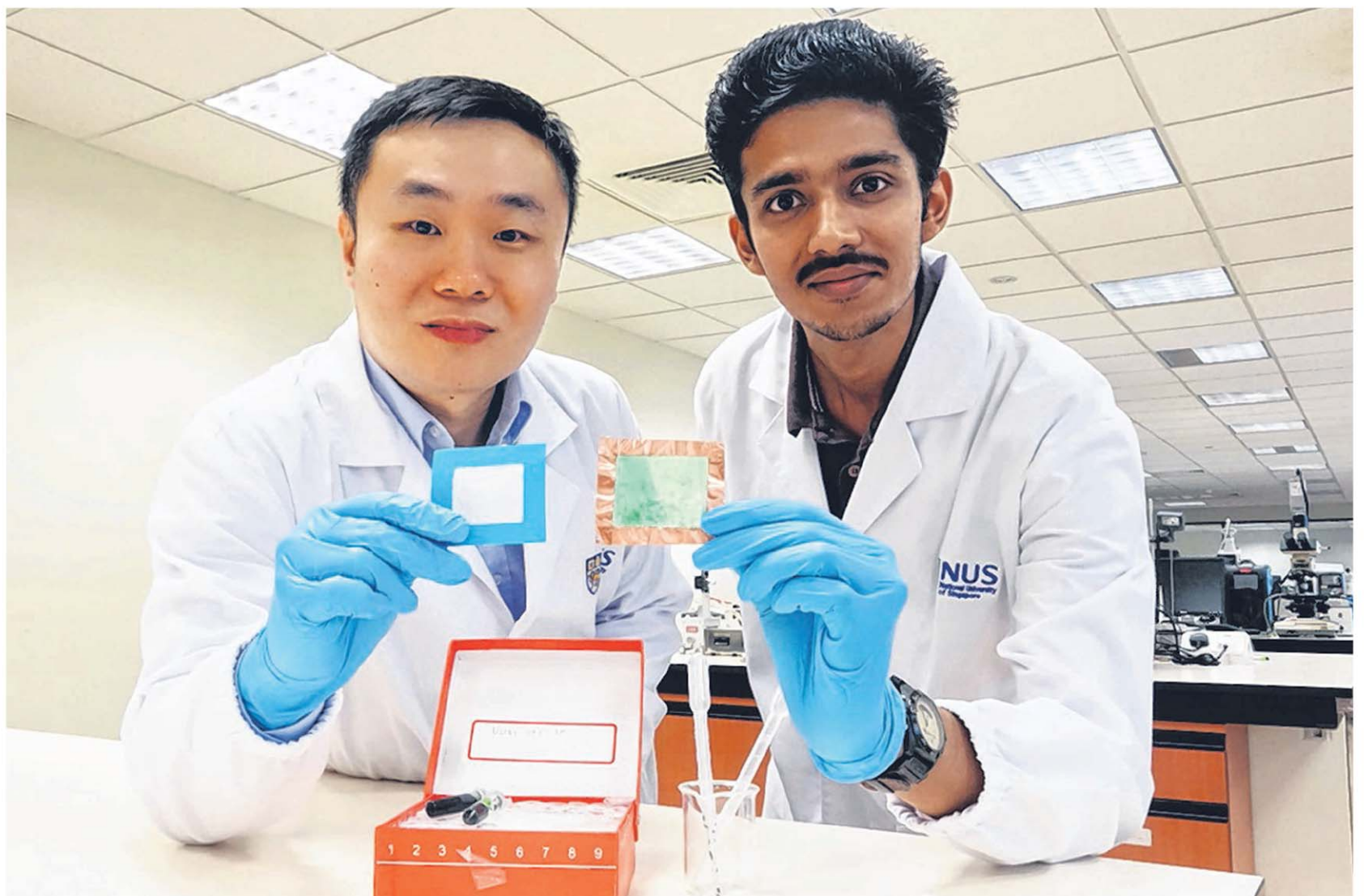
Scientists in Singapore have developed a solution that can turn an average mesh laundry bag into a haze-buster – by transforming it into an air filter that can block out harmful PM2.5 particles.

Using a chemical compound commonly used in dyeing, called phthalocyanine, the National University of Singapore (NUS) team engineered organic molecules that can self-organise, like minuscule building blocks, to form nanoparticles and, subsequently, nanofibres.

When poured onto non-woven mesh, such as an average laundry bag or mosquito net, these nanofibres – which exist in the form of an organic solution – will “cling” onto the material to create thin, see-through air filters that can remove up to 90 per cent of PM2.5 particles.

PM2.5 pollutants are smaller than 2.5 microns in diameter, or a 30th of the diameter of a strand of human hair. They constitute one of six pollutants, including carbon monoxide and sulphur dioxide, measured by the Pollutant Standards Index. Long and regular exposure to PM2.5 is linked to higher risk of death from complications such as lung cancer and heart disease.

“In the long run, it may even be possible for a DIY (do-it-yourself) kit or mosquito net, these nanofibres – which exist in the form of an organic solution – will “cling” onto the material to create thin, see-through air filters that can remove up to 90 per cent of PM2.5 particles. PM2.5 pollutants are smaller than 2.5 microns in diameter, or a 30th of the diameter of a strand of human hair. They constitute one of six pollutants, including carbon monoxide and sulphur dioxide, measured by the Pollutant Standards Index. Long and regular exposure to PM2.5 is linked to higher risk of death from complications such as lung cancer and heart disease.



A team from NUS has developed a novel nanofibre solution that can turn a piece of regular mesh (held up by Prof Tan) into an air filter (held up by PhD student Sai Kishore Ravi) which can remove up to 90 per cent of PM2.5 pollutants and achieve 2.5 times better airflow than conventional air filters. PHOTO: NUS

Creating an air filter with the solution is simple: It just needs to be poured onto the mesh, which is then hung to dry overnight. It takes about 10 hours to dry an A4-sized piece. The filters can then be used as masks or placed over windows to block out harmful particles. They will slowly turn from green to brown as they trap the particles – indicating when they need to be changed.

Prof Tan said the NUS-developed filters also allow better airflow – 2.5 times higher – than conventional ones, and block out ultraviolet rays as well. He was inspired to create a new type of air filter when his wife, who was pregnant during the haze episode in 2015, had trouble breathing when she wore regular masks.

A paper on the NUS team’s research was published recently in

the online version of peer-reviewed scientific journal, *Small*.

The researchers have filed a patent for the invention and are looking to improve on its capabilities by, for instance, equipping it with antibacterial properties. They are hoping to work with industry partners to commercialise the technology.

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