Self-healing anti-rust coating developed by NTU researchers

By LESTER HIO

LOCAL researchers have developed a coating technology that will enable cars to “heal” themselves of scratches, and that could put an end to the need for minor paint jobs.

Nanyang Technological University (NTU) Associate Professor Yang Jinglei and his team of three researchers worked on the idea of a “self-healing anti-corrosion coat” for six months before successfully creating the anti-rust coat.

The coating will, upon any scratching, form a protective layer of polymer over the scratch or dent, thereby preventing rust and corrosion from setting in.

Prof Yang says of the research that was published in the Journal of Material Chemistry in June: “By using this technology, we can heal scratches silently and fully autonomously by embedding self-healing micro-capsules. It also extends maintenance interval and saves on cost and labour.”

The coating works by embedding micro-capsules containing hexamethylene diisocyanate (HDI) into the paint coat. When the coat is scratched, these micro-capsules break open, releasing the HDI.

As HDI is reactive with water, a chemical reaction takes place with the moisture in the surrounding air, resulting in what Prof Yang analogises to “super-glue” – the HDI hardens into a polymer that seals the region and prevents corrosion from occurring.

Prof Yang says that the coating is most effective with thin scratches that may be unnoticeable under normal circumstances; long, thin scratches, about a millimetre in width, are hard to see with the naked eye but are nevertheless still susceptible to rust and corrosion.

While the technology currently exists, there is still work to be done in optimising the anti-rust coat and sending it out for field tests with actual cars.

Prof Yang is interested in deploying the coat not only on cars, but also sees great market potential in offshore industries, where the coat could potentially reduce maintenance costs due to rust and corrosion on ships.