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## Strong helmets were made from the new plastic. They reduce head injuries by 60%

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Scientists have [unveiled a](#) bicycle helmet that is designed with a new type of plastic. It cushions crash shocks and reduces injuries by 60%.

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According to a 2020 World Health Organization (WHO) report, more than 60% of reported cycling-related injuries are the result of head bumps following accidents.

Researchers at Nanyang University of Technology Singapore have partnered with French company Arkema to develop a stronger and safer bicycle helmet using a combination of materials. The prototype new helmet absorbs energy on impact and reduces the likelihood of serious injury.

The new thermoplastic resin, called Elium, was developed by Arkema, one of NTU's industrial partners. The NTU team worked with Arkema engineers to develop the Elium molding process to produce more durable bicycle helmets.

Cycling helmets usually have two components. The first is an outer shell made from a mass-produced plastic such as polycarbonate. Beneath it is a layer of expanded polystyrene, the same material used in food packaging and takeout boxes.

The team's new composite helmet replaces the traditional polycarbonate outer shell with a carbon fiber-reinforced Elium shell. This reinforcement makes the outer shell stronger, stiffer and less fragile than the polycarbonate shell. These properties allow the outer shell to absorb more impact energy for a longer time and distribute it evenly throughout the helmet.

As a result, the overall force on the head is reduced, thereby reducing the likelihood of critical injuries.