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PolyU develops unique electrostatically charged nanofiber

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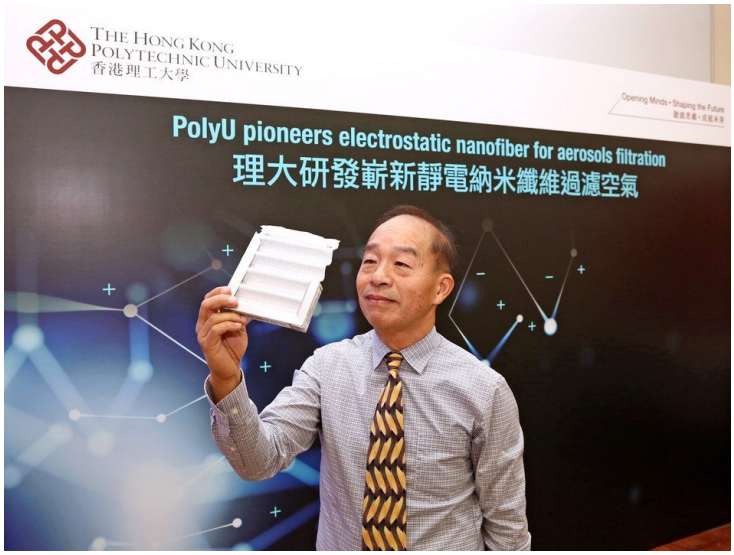

The Department of Mechanical Engineering of The Hong Kong Polytechnic University (PolyU) has recently developed an electrostatically charged nanofiber filter with multiple separator layers, which can capture pollutant particles that are below 100 nm in diameter (covering the most common airborne nano-particles and viruses).

The novel nanofiber filter demonstrates better performance in terms of breathability, filtration efficiency (10% higher than the conventional electret microfiber filter), and shelf life (up to 90 days).

Nano-aerosols of 100 nm and below in diameter exist everywhere in urban environments, and by virtue of their small sizes, can be easily inhaled into human bodies. Most airborne viruses, from influenza to epidemic viruses like Swine Flu or SARS, are also in the size range of 100 nm. It remains a challenging mission for scientists to develop user-friendly air filter or mask for effective capture of nano-particles and to protect people from harmful airborne contaminants and viruses that may affect health.

PolyU's innovation can be widely applied in air filtration, from industrial to personal and household applications.

The electret PVDF nanofiber filter can be used in Western Blot, an analytical technique widely used to detect or extract proteins. In the process, PVDF membrane is often used in transferring proteins separated from the original sample. The PolyU innovation can help greatly enhance the nanofiber mat's electrostatic force in capturing protein, while maintaining the protein integrity without affecting its organization.

The innovation can also be applied to effective release of protein-based drugs. Drugs made in powder form, for example asthma drug, can be captured electrostatically by the charged PVDF nanofiber mat for more effective release and inhalation by users. Other than drugs delivered by inhalation, the innovation can also be applied similarly to drugs for use topically over skin.