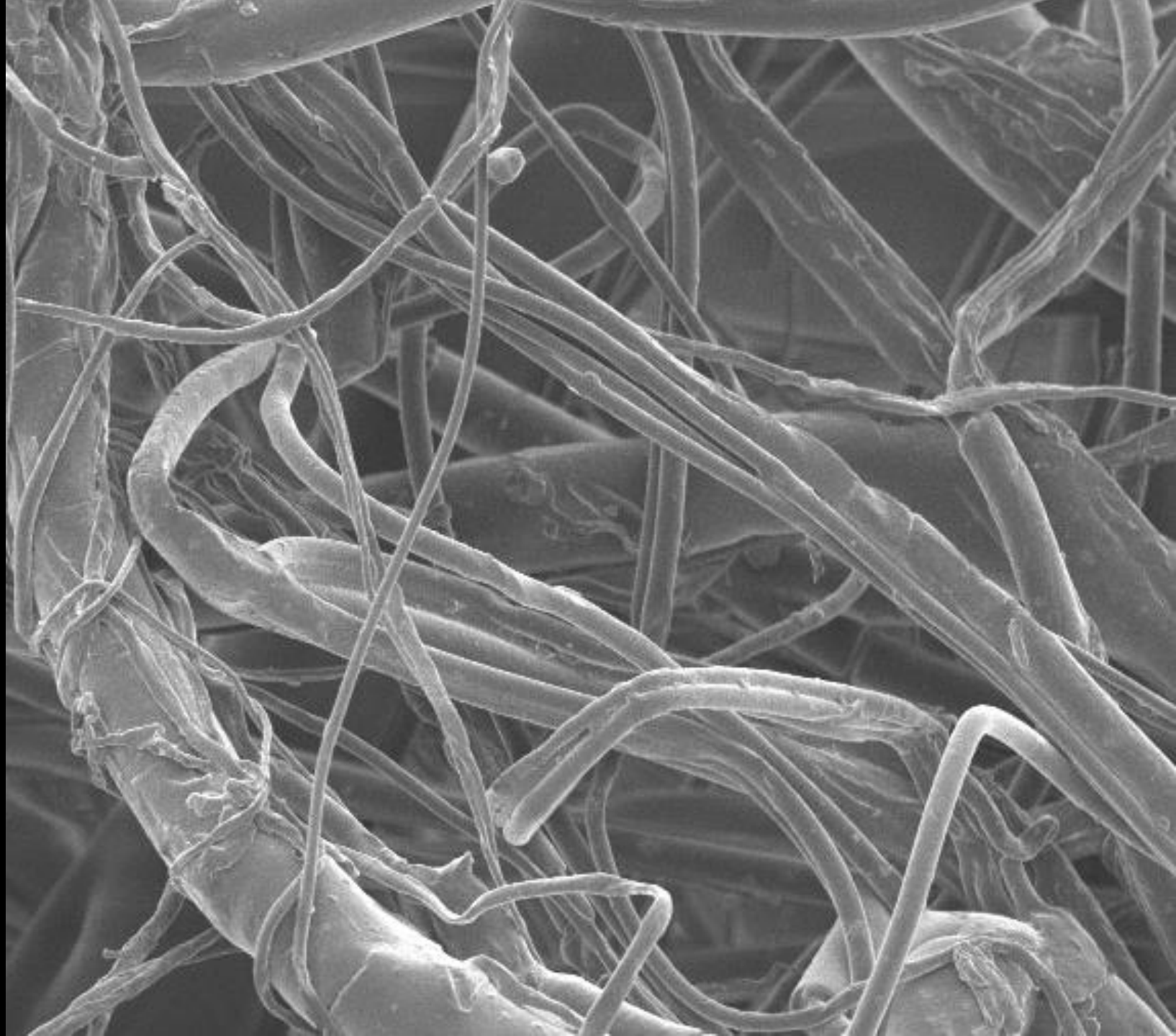
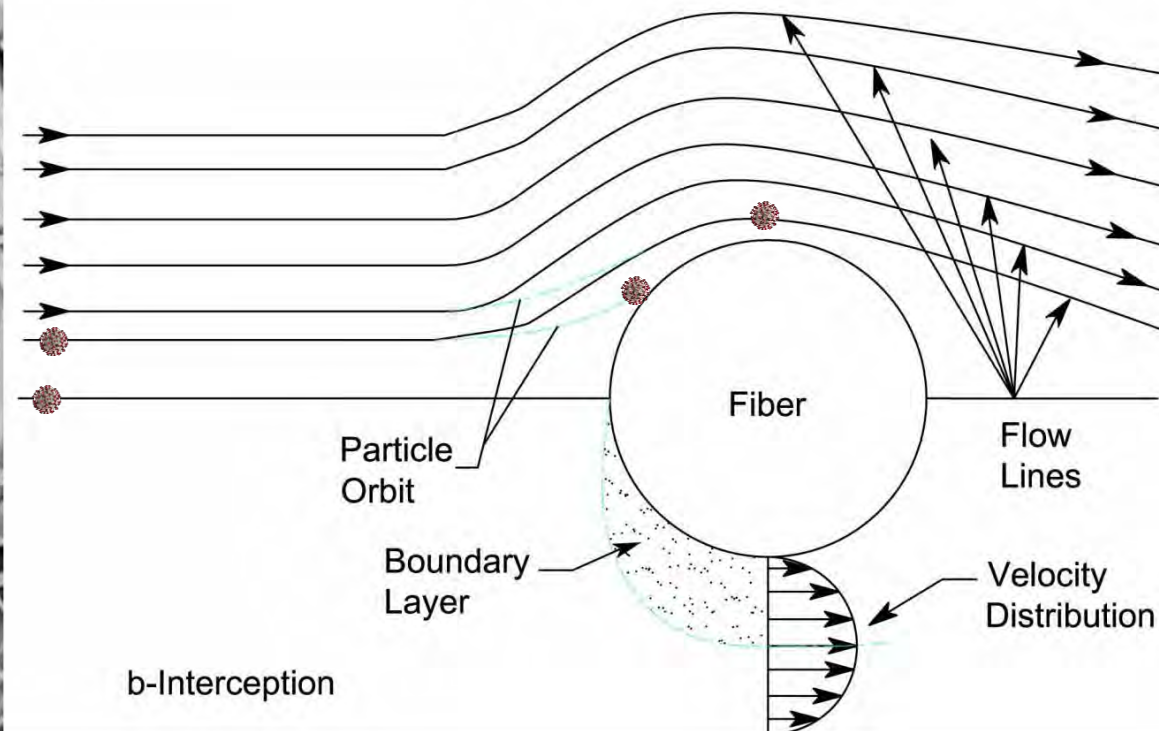
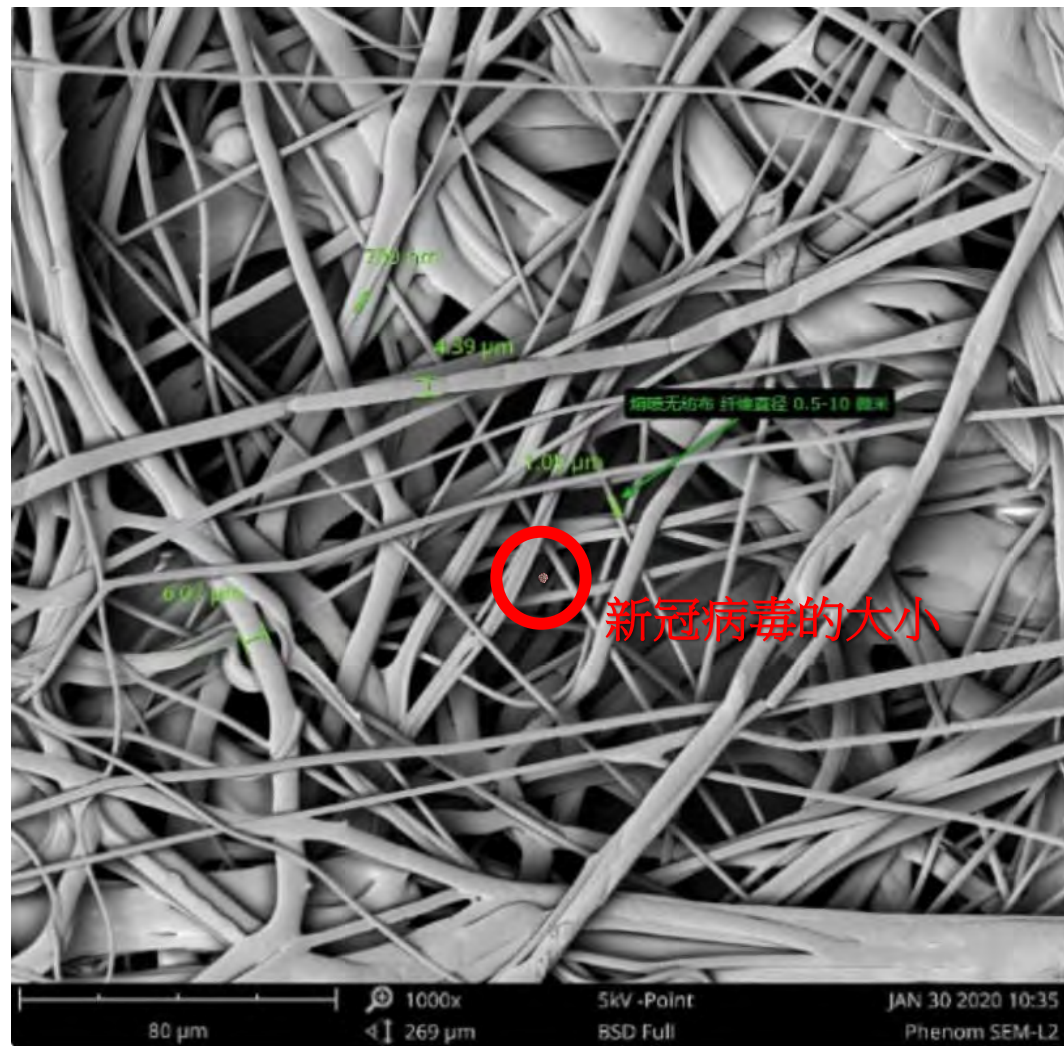

口罩技术突破： 拦截及杀灭新冠 病毒的口罩

居安有限公司 - 柯俊贤

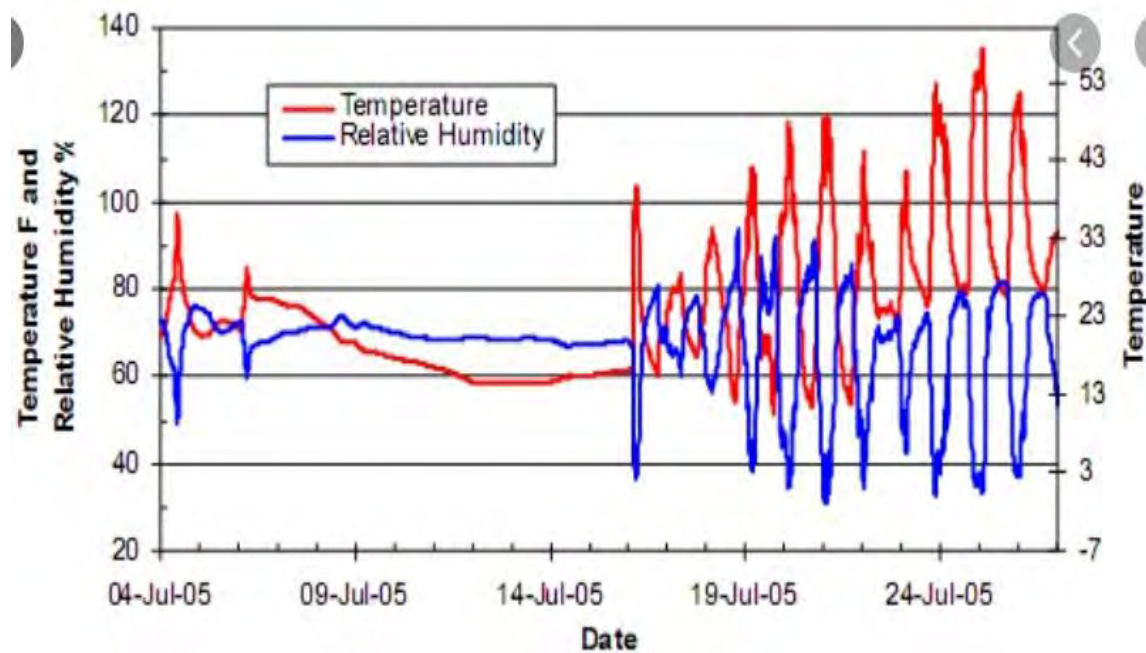


传统口罩缺憾

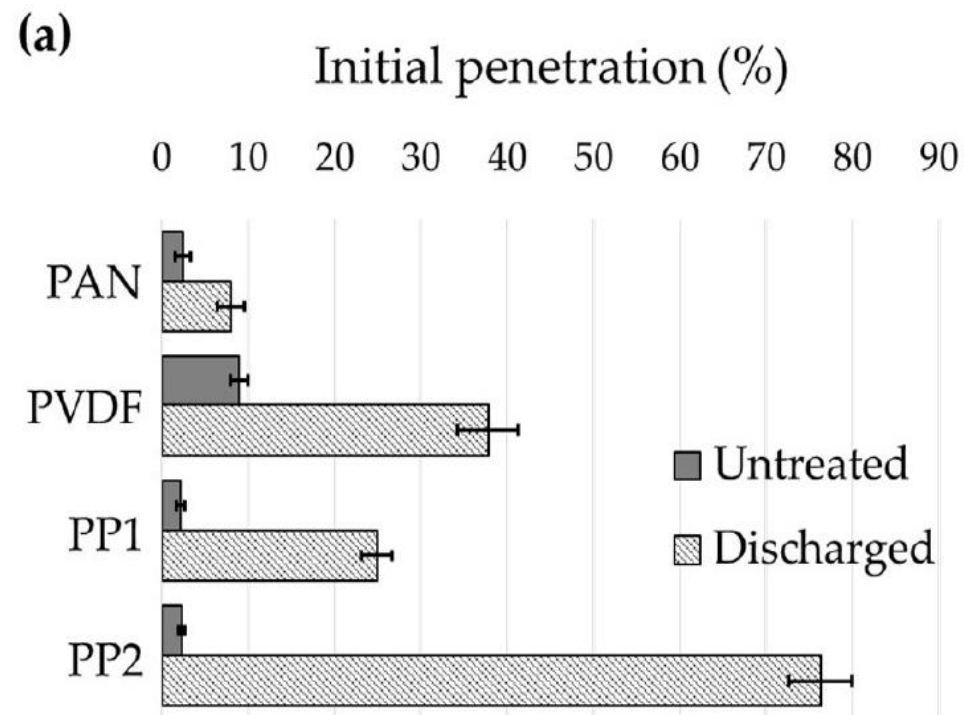




熔喷布依靠静电吸附及拦截新冠病毒

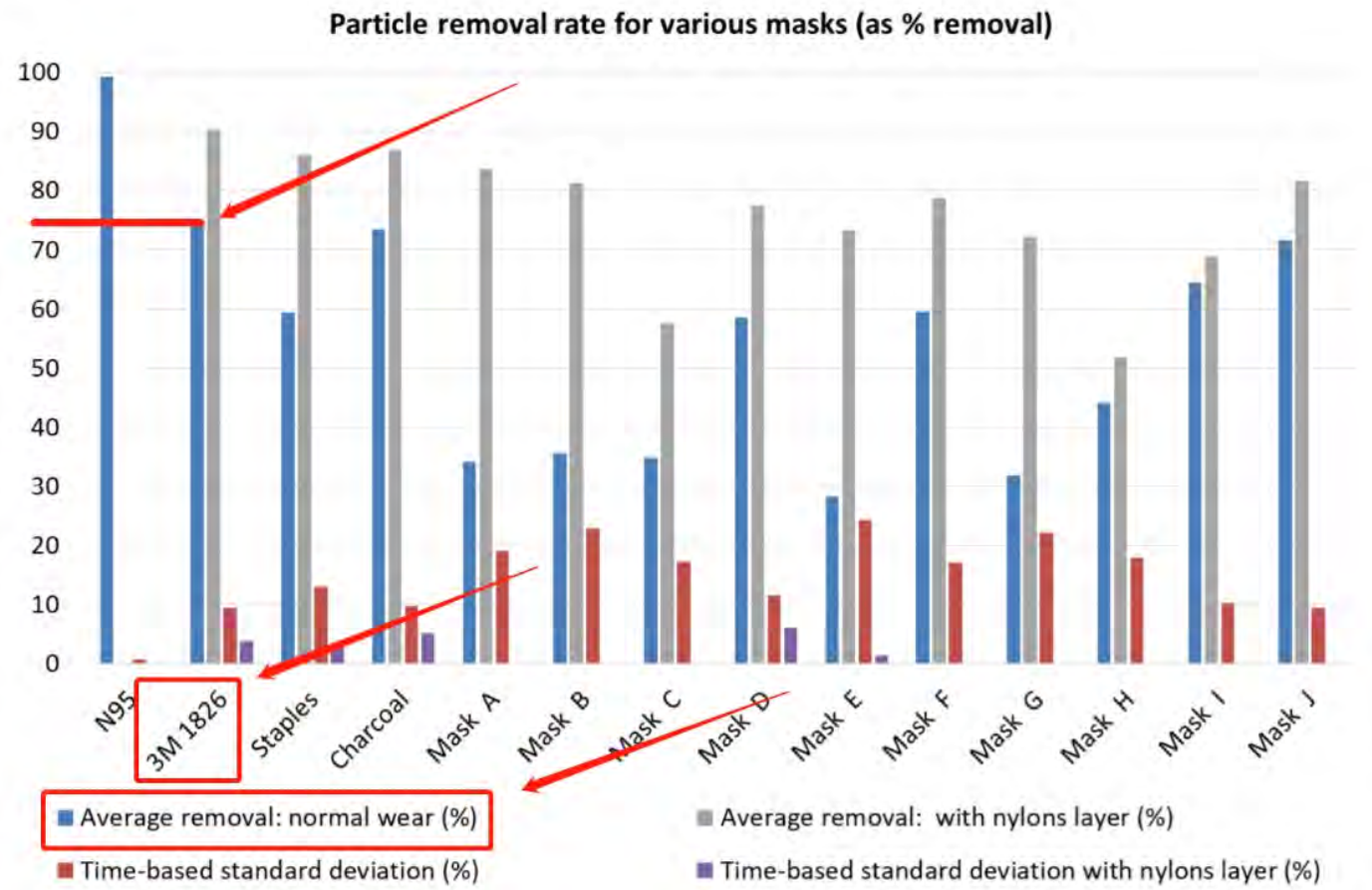


海运过程中温度及湿度的变化

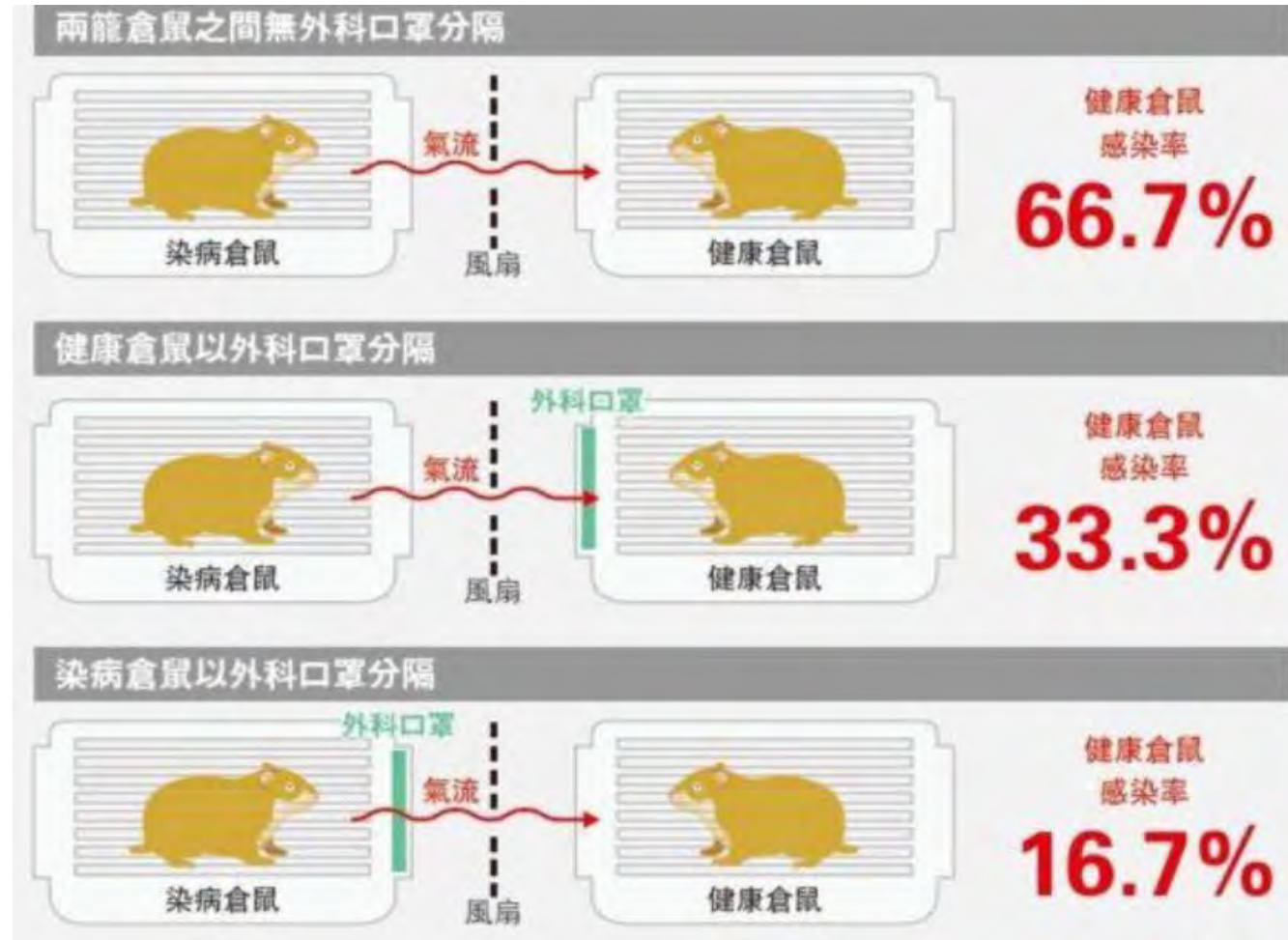


过滤效率会在静电放电后大幅降低

静电会因运输时受到高温及高湿而导致放电，从而损失过滤效率



波士顿东北大学发现3M口罩平均只有75%过滤效率



香港大學發現熔噴布口罩在面對新型變種新冠病毒
只有66.6% / 83.3%保護效率

News

Covid-19: North Dakota and Belgium have let infected health staff work on wards

BMJ 2020 ; 371 doi: <https://doi.org/10.1136/bmj.m4455> (Published 16 November 2020)

Cite this as: *BMJ* 2020;371:m4455

Read our latest coverage of the coronavirus outbreak

Article

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Metrics

Responses

Philippe Devos, head of Belgium's association of medical unions, said in an interview with *Deutsche Welle* that 10% of doctors and nurses at his hospital, CHC Montlegia, were at home sick because of covid-19, while in other hospitals in the country the absence rate was 25%.⁴ "We don't have any solution any more," he said. "We are forced to ask them to work, if they agree."

比利时有接近25%医护人员受新冠病毒感染
比利时的口罩要求是全球最高

COVID-19 has infected some **570,000 health workers** and killed 2,500 in the Americas, PAHO Director says

2 Sep 2020

Despite downward trends, human cost of pandemic remains unacceptably high, with almost 4,000 deaths a day in region

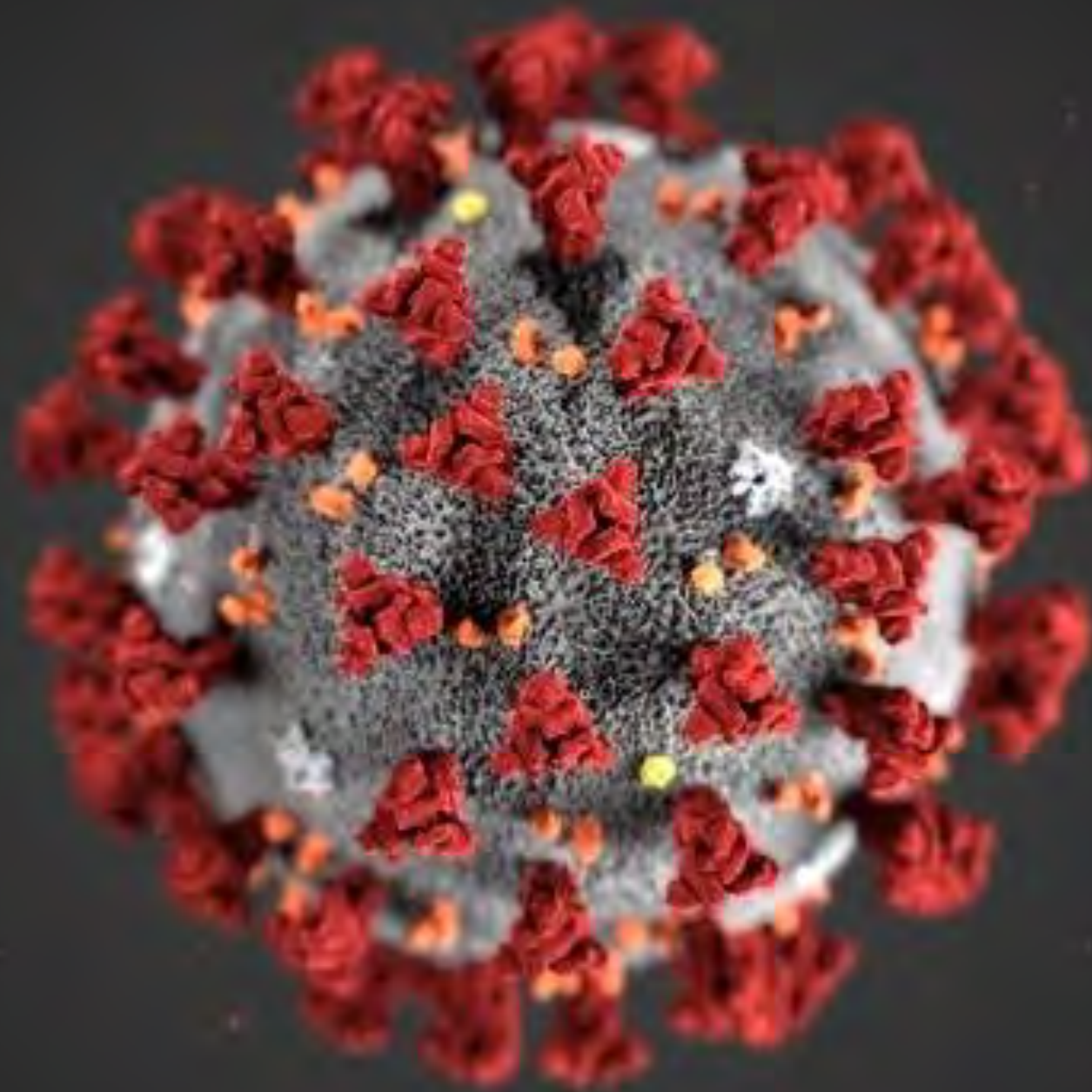
Washington D.C., September 2, 2020 (PAHO) – Health workers are especially vulnerable to COVID-19, and in the Region of the Americas,

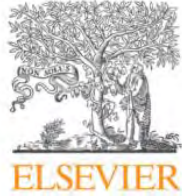


“We have the highest number of health care workers infected in the world,” PAHO Director Carissa F. Etienne said during a press conference today. “Our data shows that nearly 570,000 health workers across our region have fallen ill and more than 2,500 have succumbed to the virus.”

美国有超过57万医护人员受新冠病毒感染
美国的口罩要求是全球最高

口罩新技術路線





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Negatively charged residues in the endodomain are critical for specific assembly of spike protein into murine coronavirus



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ABSTRACT

Coronavirus spike (S) protein assembles into virions via its carboxy-terminus, which is composed of a transmembrane domain and an endodomain. Here, the carboxy-terminal charge-rich motif in the endodomain was verified to be critical for the specificity of S assembly into mouse hepatitis virus (MHV). Recombinant MHVs exhibited a range of abilities to accommodate the homologous S endodomains from the betacoronaviruses bovine coronavirus and human SARS-associated coronavirus, the alphacoronavirus porcine transmissible gastroenteritis virus (TGEV), and the gammacoronavirus avian infectious bronchitis virus respectively. Interestingly, in TGEV endodomain chimeras the reverting mutations resulted in stronger S incorporation into virions, and a net gain of negatively charged residues in the charge-rich motif accounted for the improvement. Additionally, MHV S assembly could also be rescued by the acidic carboxy-terminal domain of the nucleocapsid protein. These results indicate an important role for negatively charged endodomain residues in the incorporation of MHV S protein into assembled virions.

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冠状病毒表面的刺突蛋白是偏负电极

This coronavirus mutation has taken over the world. Scientists are trying to understand why.

Studying both versions of the gene using a proxy virus in a petri dish of human cells, Choe and her colleagues found that viruses with the G variant had **more spike proteins**, and the outer parts of those proteins were less likely to break off. This made the virus approximately 10 times more infectious in the lab experiment.

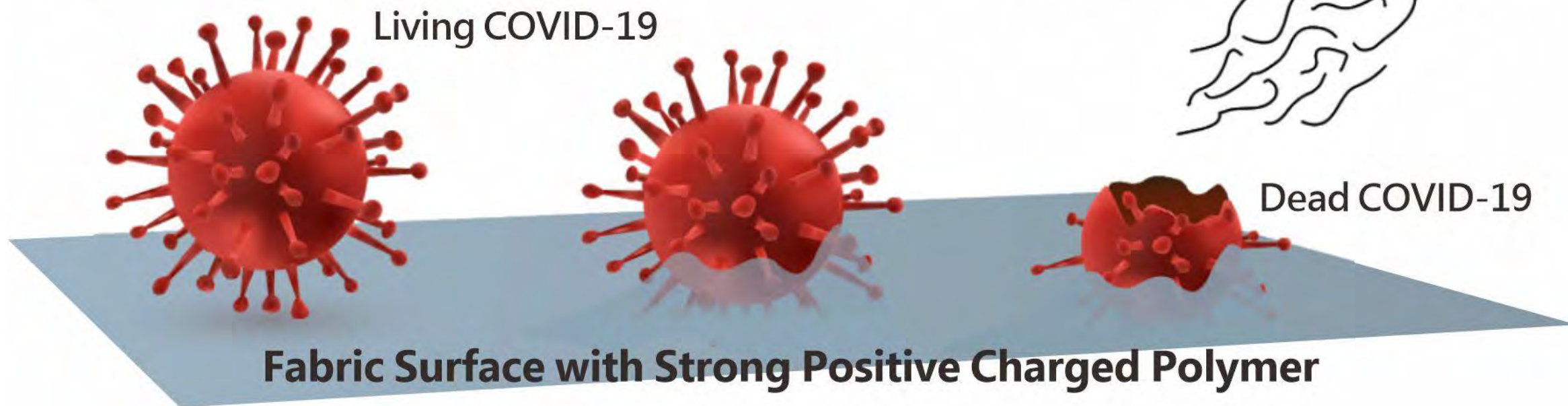
新冠病毒的变种趋势是越来越多刺突蛋白
换言之变成越来越负电极

Technical Path

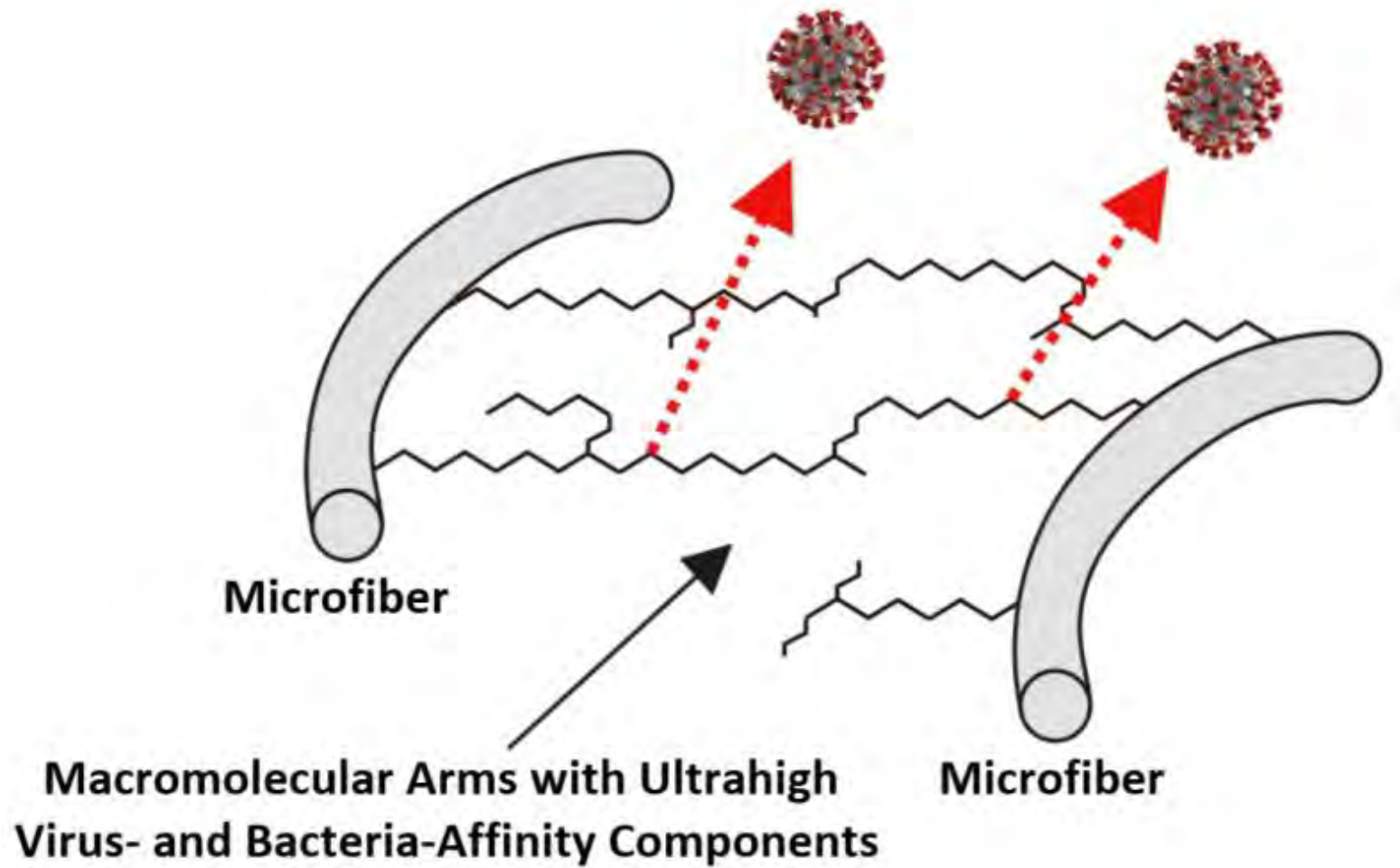
1. Strong positive charged polymer attract negative charged protein based biohazard like COVID-19

2. Polymer arrest biohazard like COVID-19

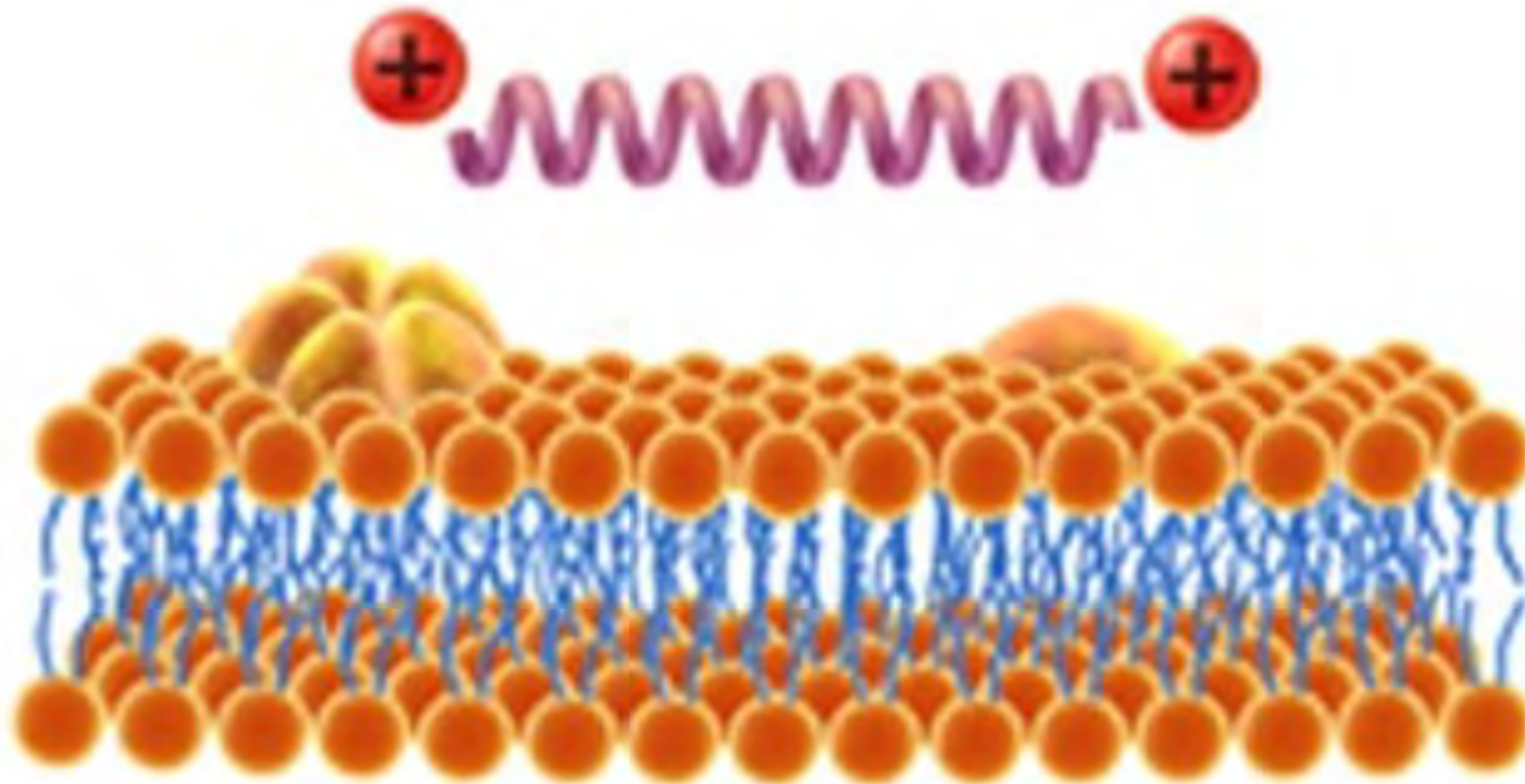
3. Polymer tear off envelope of biohazard like COVID-19



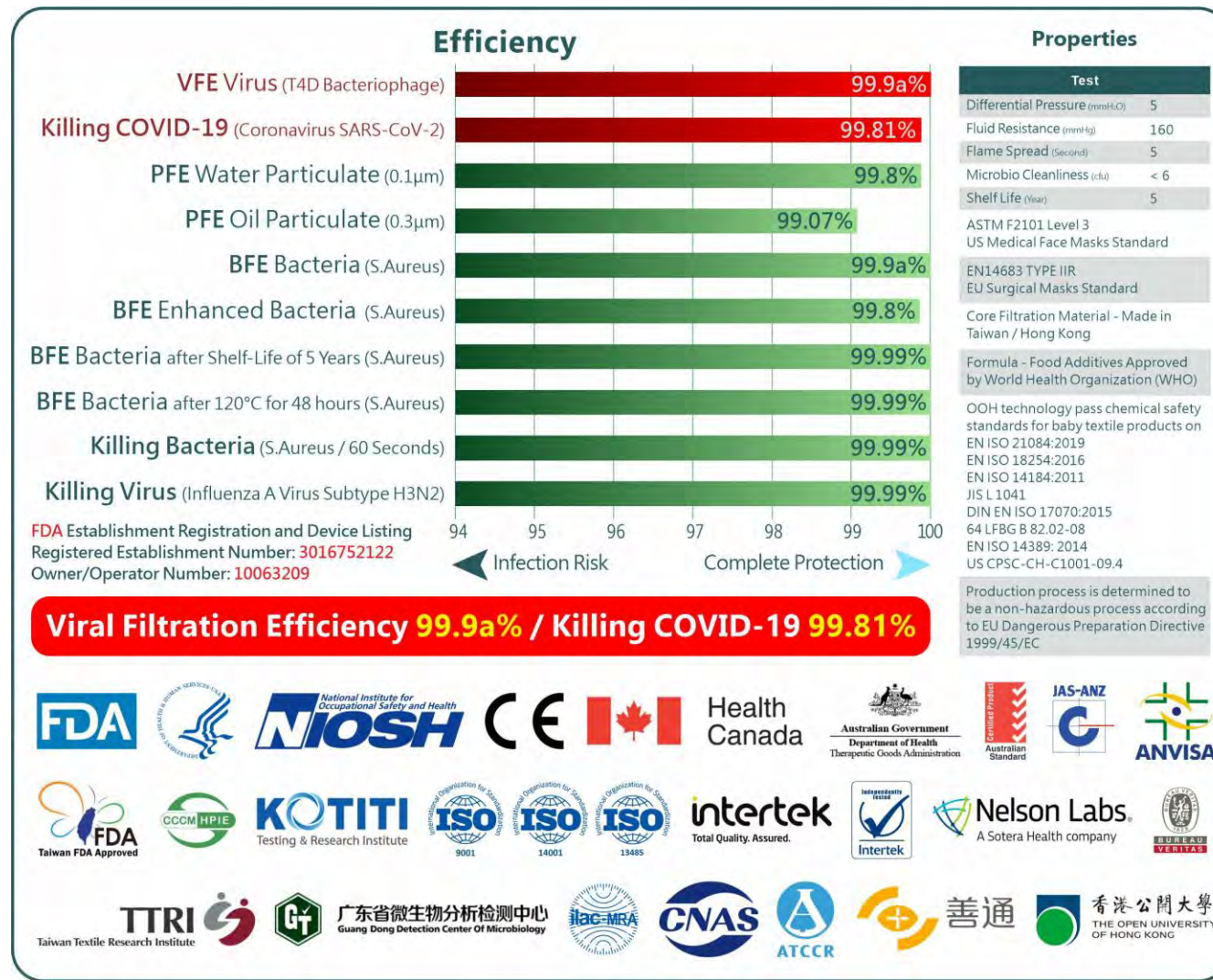
1. 纤维基底表面的强正极聚合物会吸附带负极的蛋白质细菌病毒，例如新冠病毒
2. 强正极会拦截细菌病毒
3. 强正极会撕破细菌病毒表面的包膜，从而杀死细菌病毒



于纤维基底间建立强正极聚合物纳米结构
利用强正极吸附新冠病毒



强正极会拉扯新冠病毒包膜上的带有负极性磷酸酯头部
从而撕破及杀死新冠病毒



新技术路线能同时拦截及杀灭新冠病毒

Results:

Test Article Number	Percent VFE (%)
1	>99.9 ^a
2	>99.9 ^a
3	>99.9 ^a
4	>99.9 ^a
5	>99.9 ^a

^a There were no detected plaques on any of the Andersen sampler plates for this test article.

The filtration efficiency percentages were calculated using the following equation:

$$\% VFE = \frac{C - T}{C} \times 100$$

C = Positive control average

T = Plate count total recovered downstream of the test article

Note: The plate count total is available upon request

新技术能拦截99.9a%病毒

Test results

Virus Types	(NO)	$\lg(V_{a0h})$ ($\lg\text{TCID}_{50}/\text{mL}$)	$\lg(V_{b2h})$ ($\lg\text{TCID}_{50}/\text{mL}$)	$\lg(V_{c2h})$ ($\lg\text{TCID}_{50}/\text{mL}$)
COVID-19 virus MDCK cells	1	6.73	6.68	3.7
	2	6.68	6.56	4
	3	6.7	6.57	3.9
Average Value of $\lg\text{TCID}_{50}/\text{mL}$		6.70	6.61	3.88
Antiviral Activity Value		2.72		
Antiviral Activity Rate (%)		99.81		

新技术能杀死99.81%的新冠病毒

建立新口罩标准 的重要性



现时口罩标准的漏洞

- 外国的ASTM F2100 / NIOSH / EN14683 / EN149重点在于**微粒子过滤效率 (PFE)**
 - 微粒子过滤效率 (PFE) 利用**中性盐粒子 (NaCl) 来检测**
 - **中性盐粒子 (NaCl) 和新冠病毒 (COVID-19) 的物理特性和运动有根本性分别**
 - 偏负极的**静电能很好地感应中性粒子**，从而有效吸付中性粒子
 - 偏负极的**静电对偏负极的新冠病毒的吸附能力是不如应对中性粒子**
 - 新冠病毒的**变种是趋向负极**
-

现时口罩标准的漏洞

- 现时标准并没有考虑：
 - 在运输过程的静电流失
 - 使用口罩时头部摇晃对过滤效能的影响
 - 新冠病毒的物理特性和变种趋向
 - 我们根据过时的口罩标准制造口罩
 - 按过时的标准所制造的口罩，造成西方国家大规模的医护感染
-

同心抗疫 *Together,*
We Fight the Virus!
