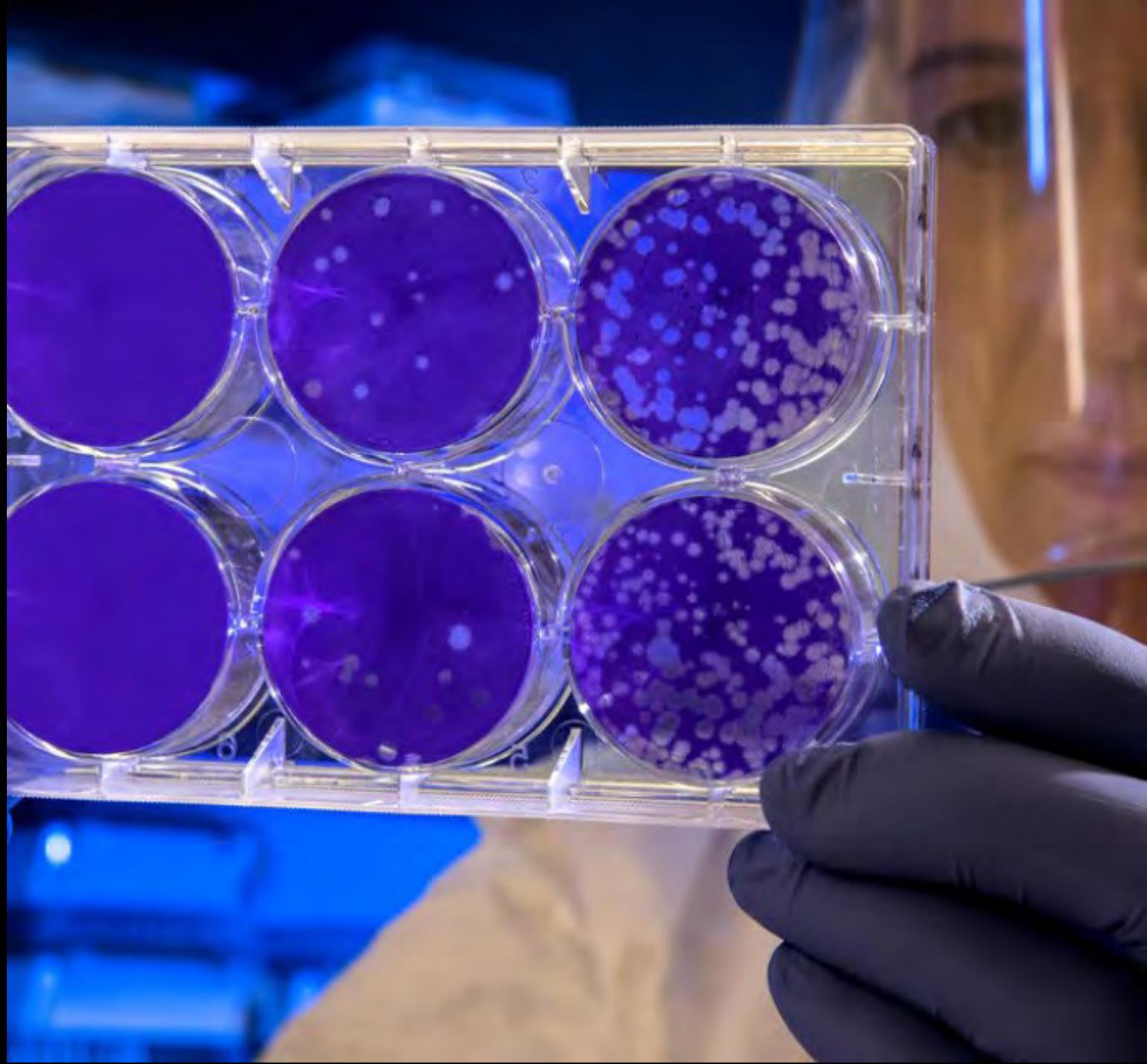


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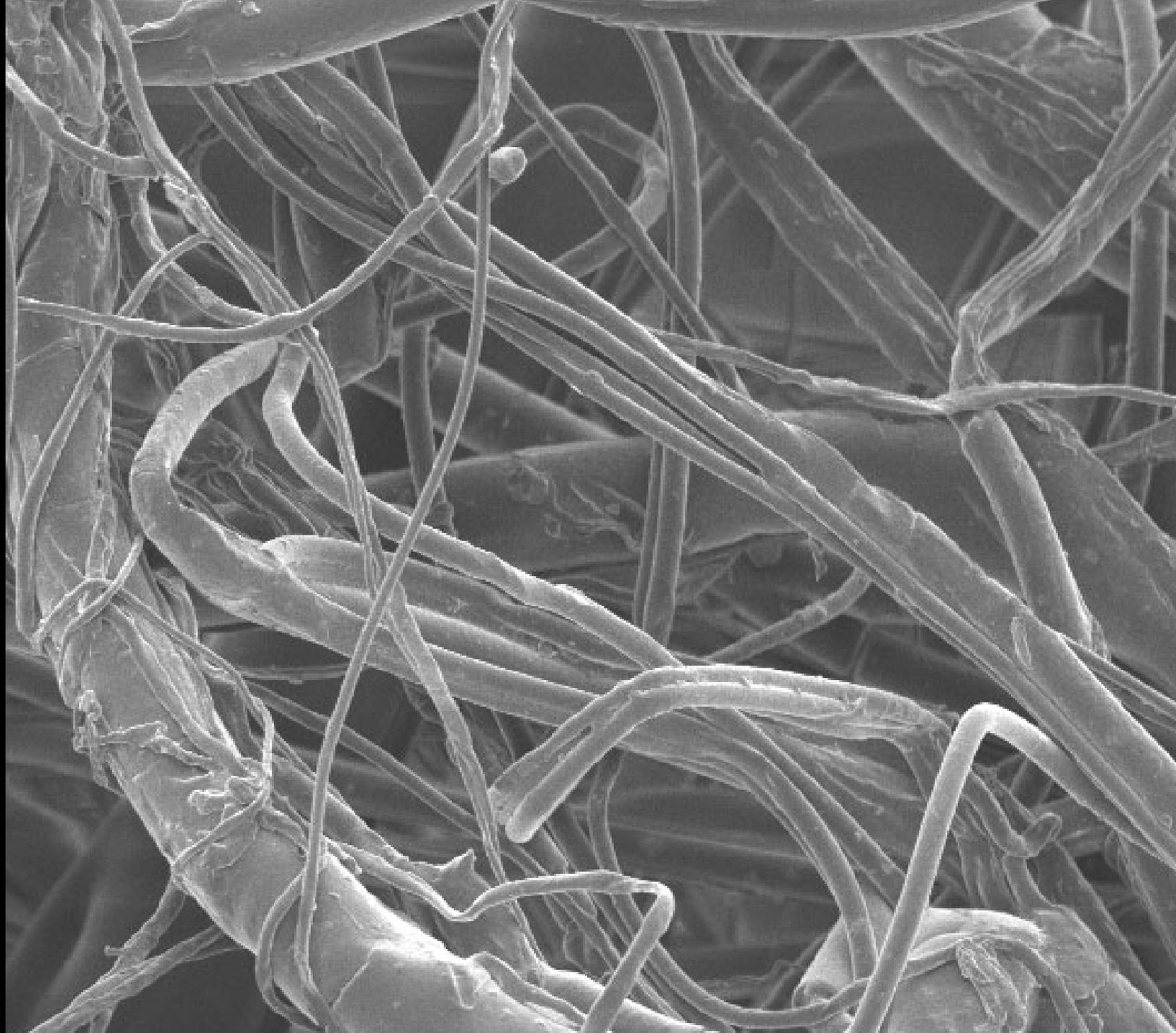
# 口罩技术突破： 拦截及杀灭新冠 病毒的口罩

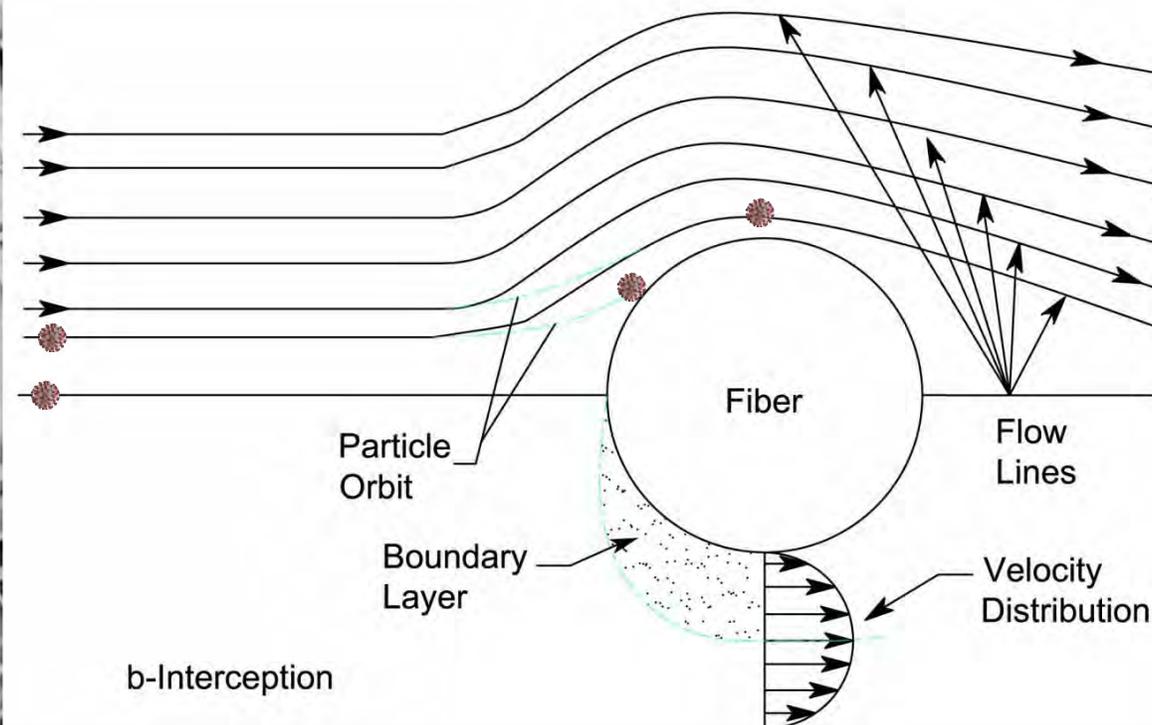
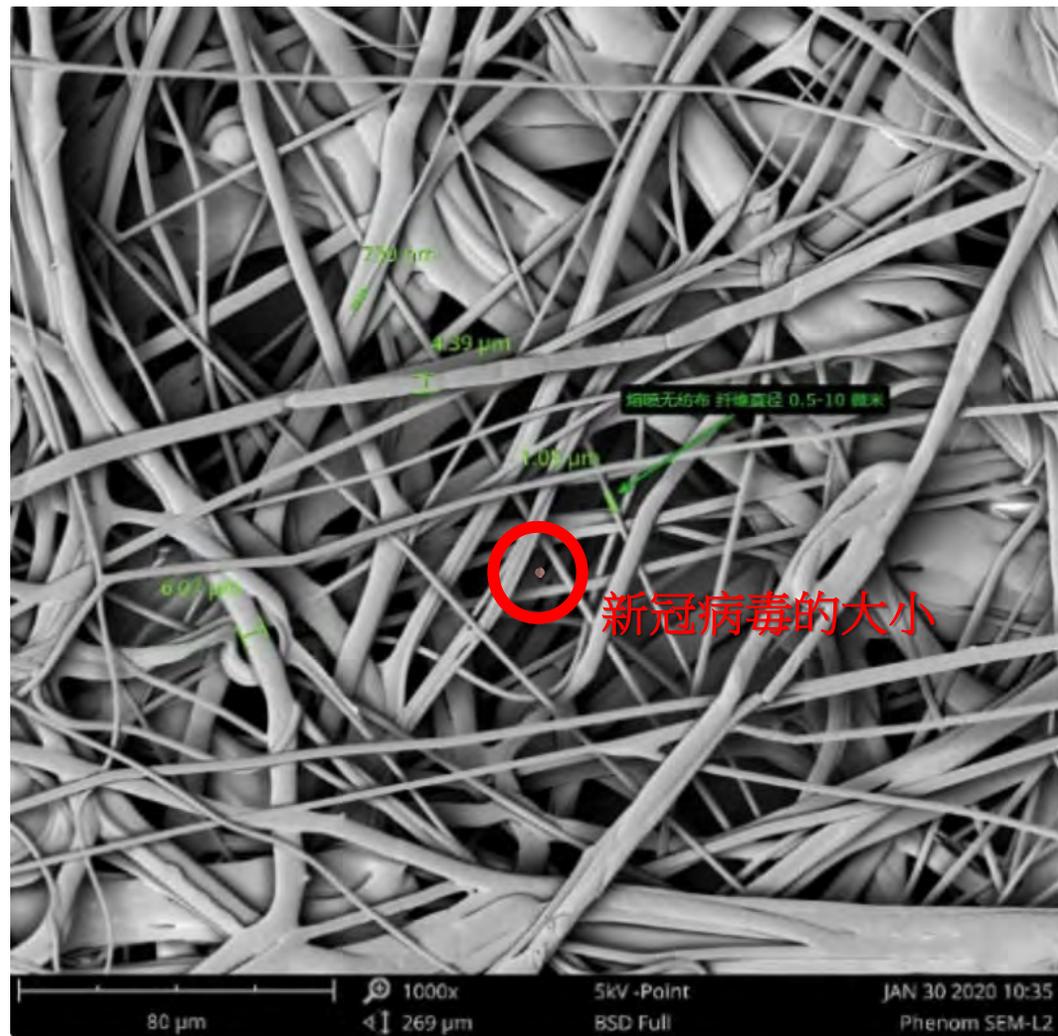
居安有限公司 - 柯俊贤



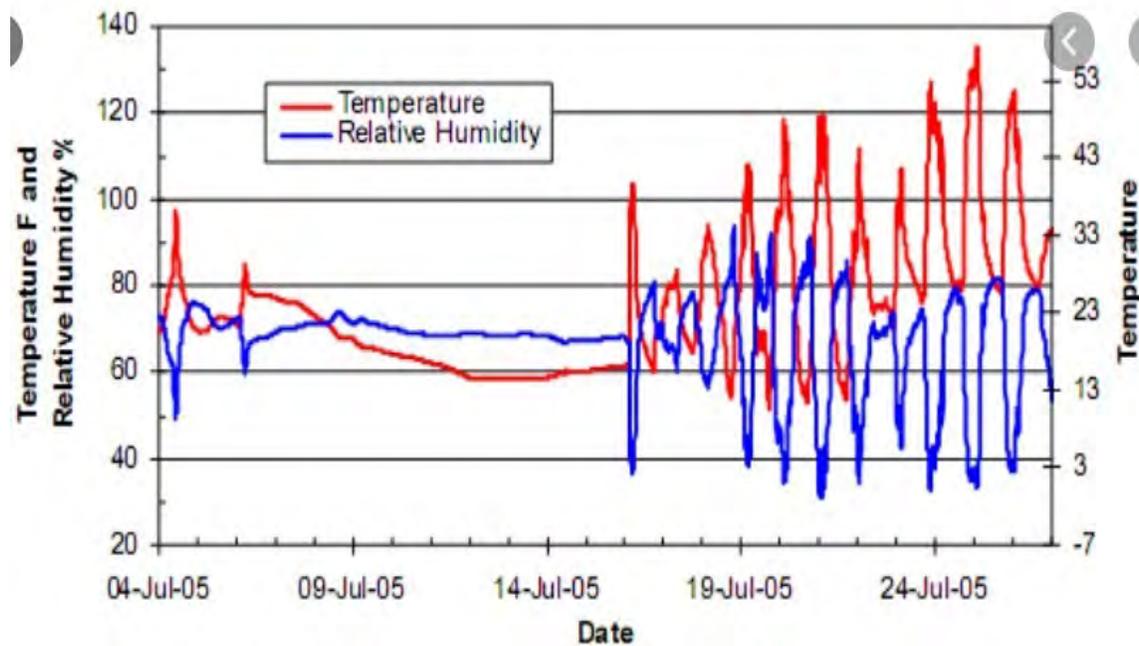
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# 传统口罩缺憾

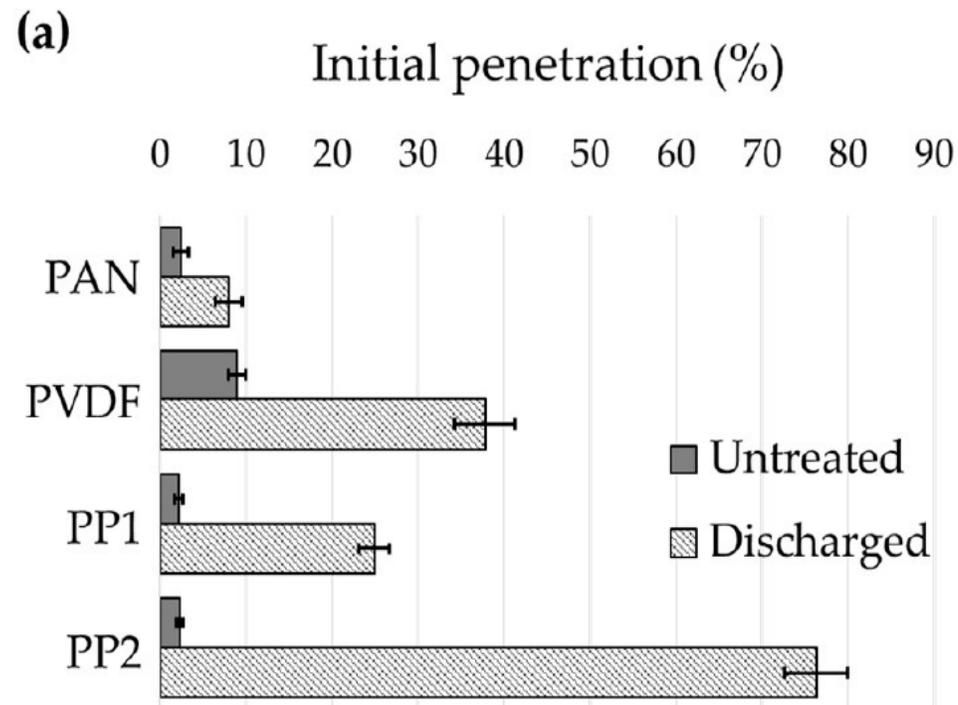




熔喷布依靠静电吸附及拦截新冠病毒

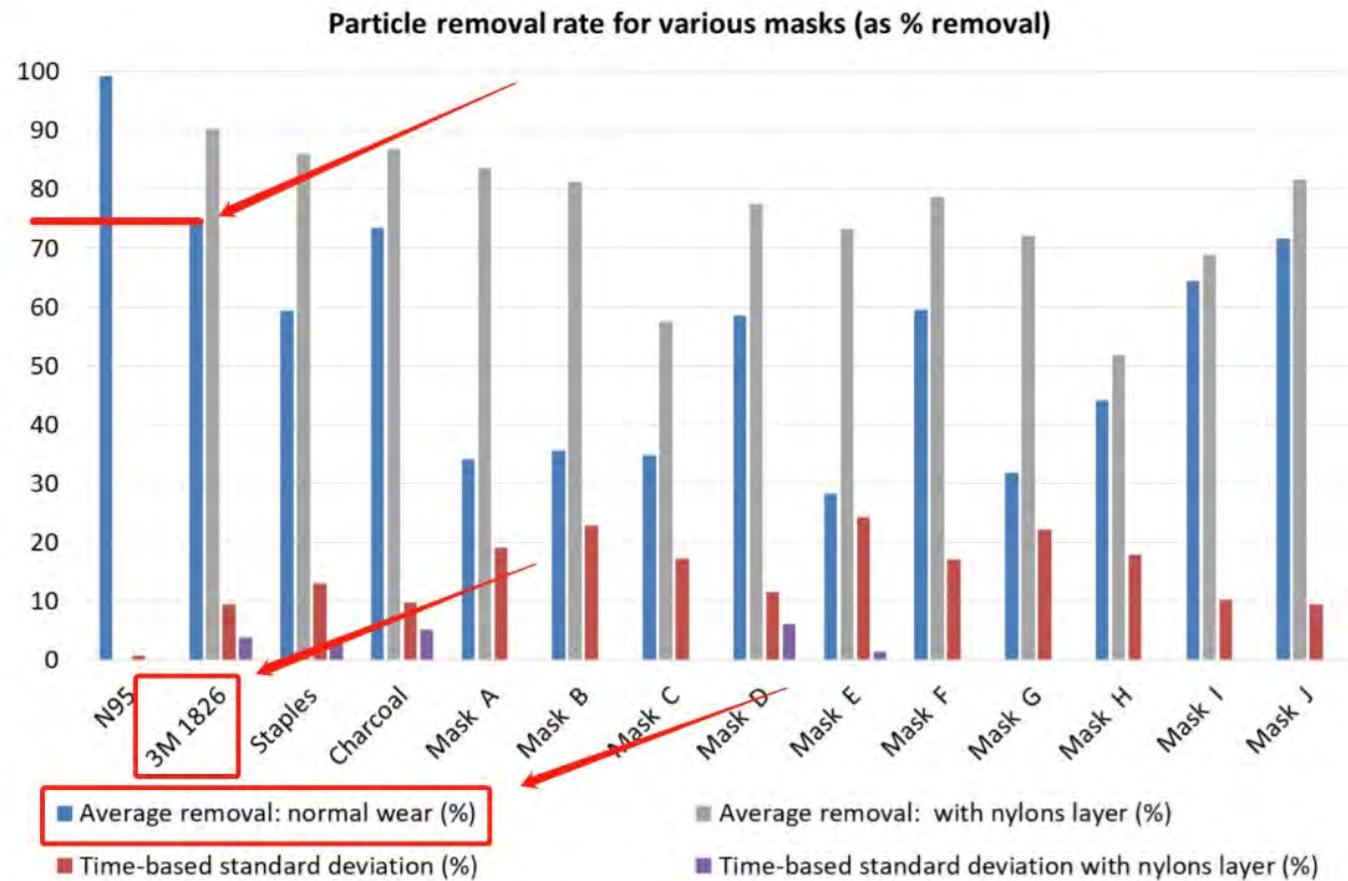


海运过程中温度及湿度的变化

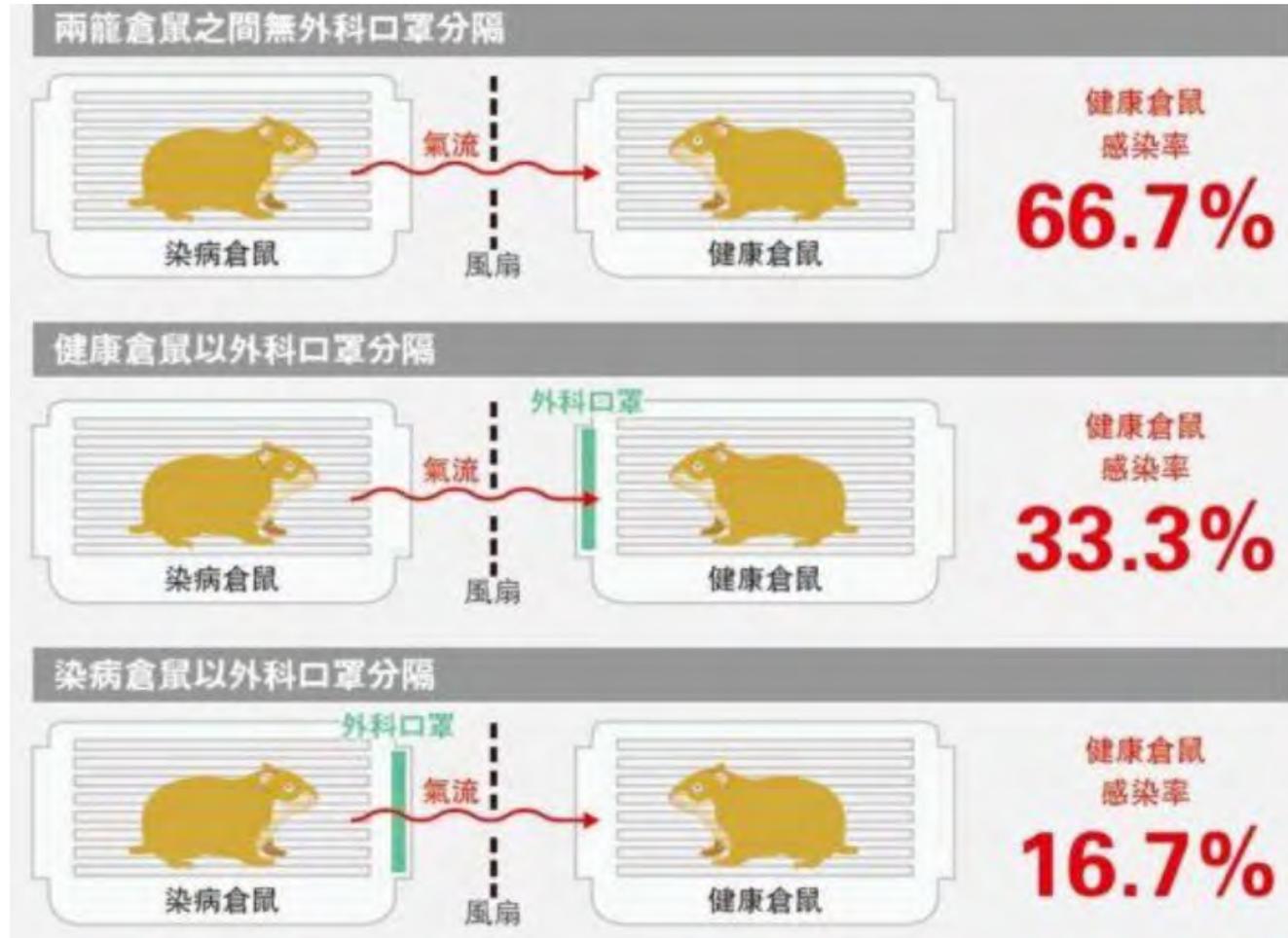


过滤效率会在静电放电后大幅降低

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

Related content

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%.<sup>4</sup> "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,



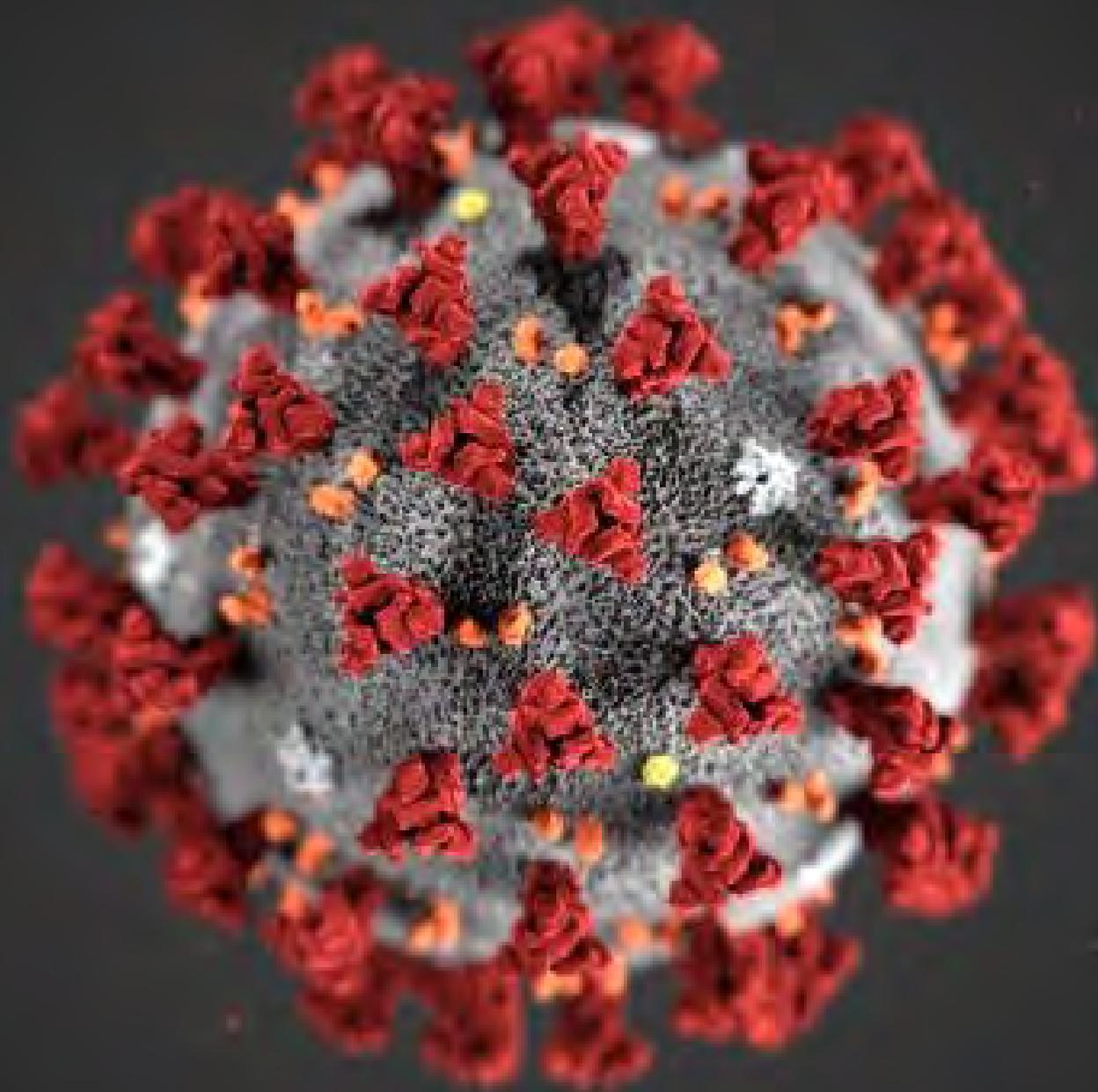
“We have the highest number of health care workers infected in the world,” PAHO Director Carissa F. Etienne said during a press conference today. “Our data shows that nearly 570,000 health workers across our region have fallen ill and more than 2,500 have succumbed to the virus.”

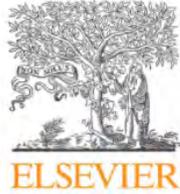
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美国有超过57万医护人员受新冠病毒感染  
美国的口罩要求是全球最高

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# 口罩新技術路線





Contents lists available at SciVerse ScienceDirect

Virology

journal homepage: [www.elsevier.com/locate/yviro](http://www.elsevier.com/locate/yviro)



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



Qianqian Yao<sup>a</sup>, Paul S. Masters<sup>b</sup>, Rong Ye<sup>a,\*</sup>

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ARTICLE INFO

Article history:

Received 20 February 2013

Returned to author for revisions

1 April 2013

Accepted 1 April 2013

Available online 28 April 2013

Keywords:

Coronavirus

Spike glycoprotein

Assembly

Endodomain

Negatively charged residues

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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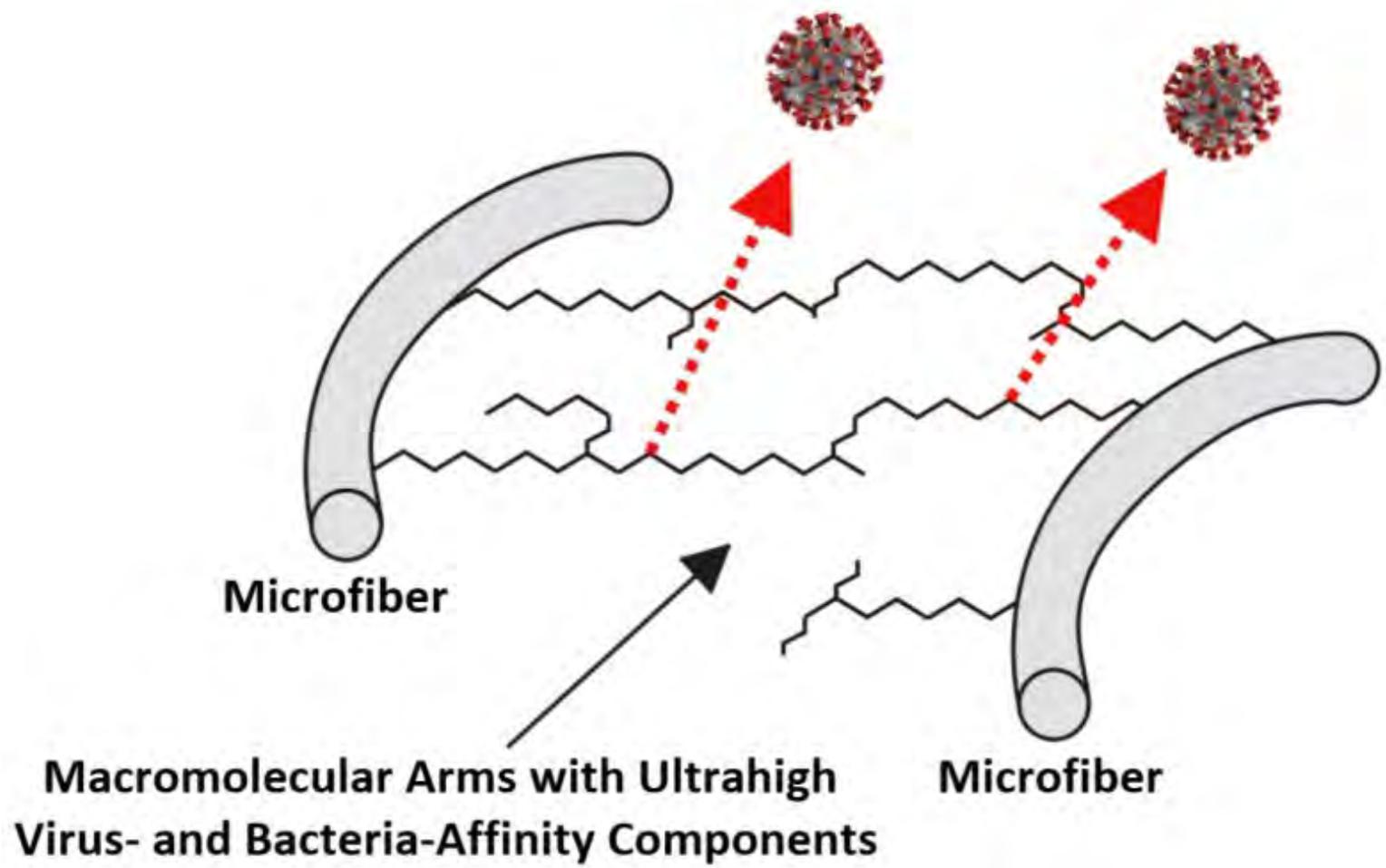
冠状病毒表面的刺突蛋白是偏负电极

# 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.

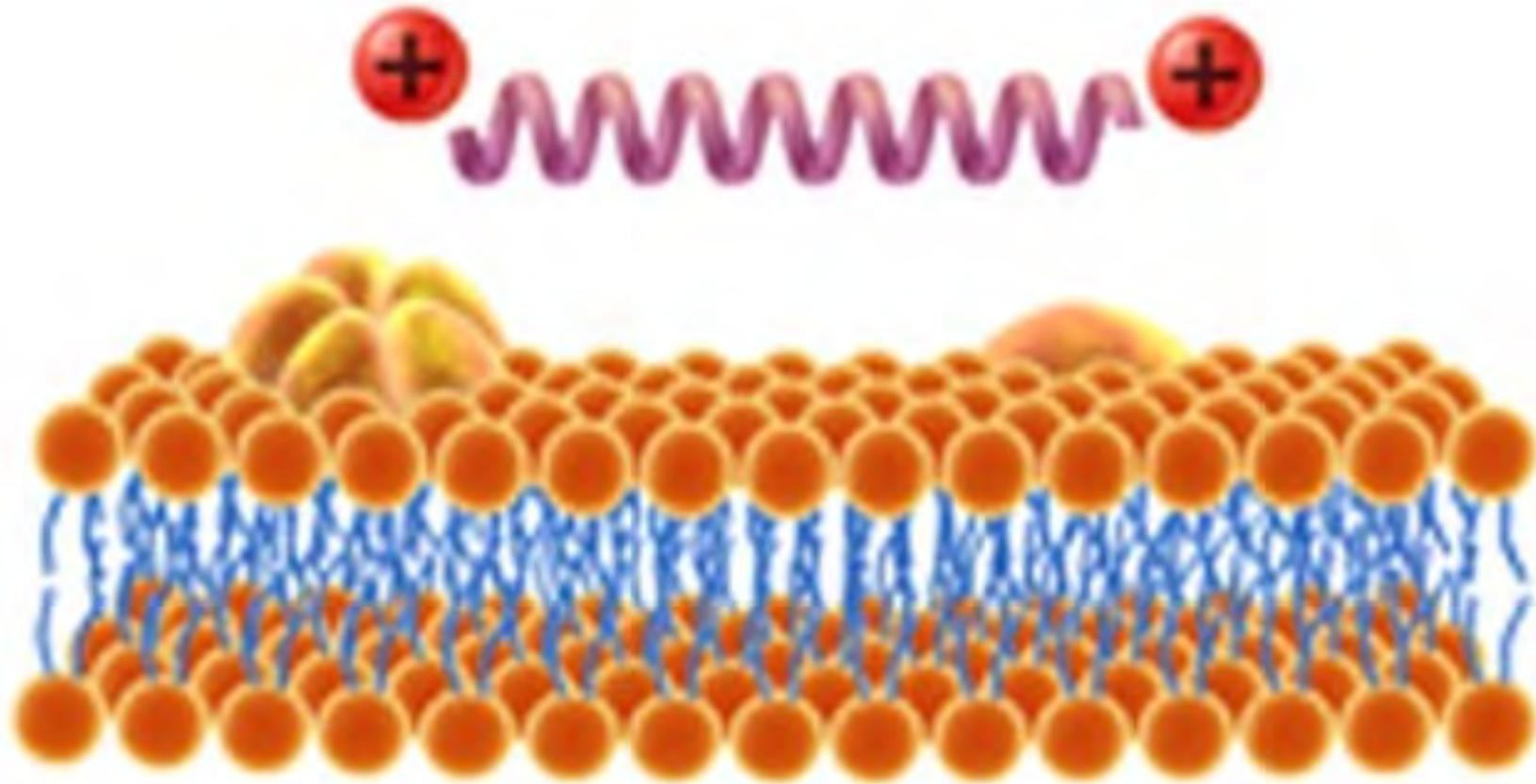
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新冠病毒的变种趋势是越来越多刺突蛋白  
换言之变成越来越负电极



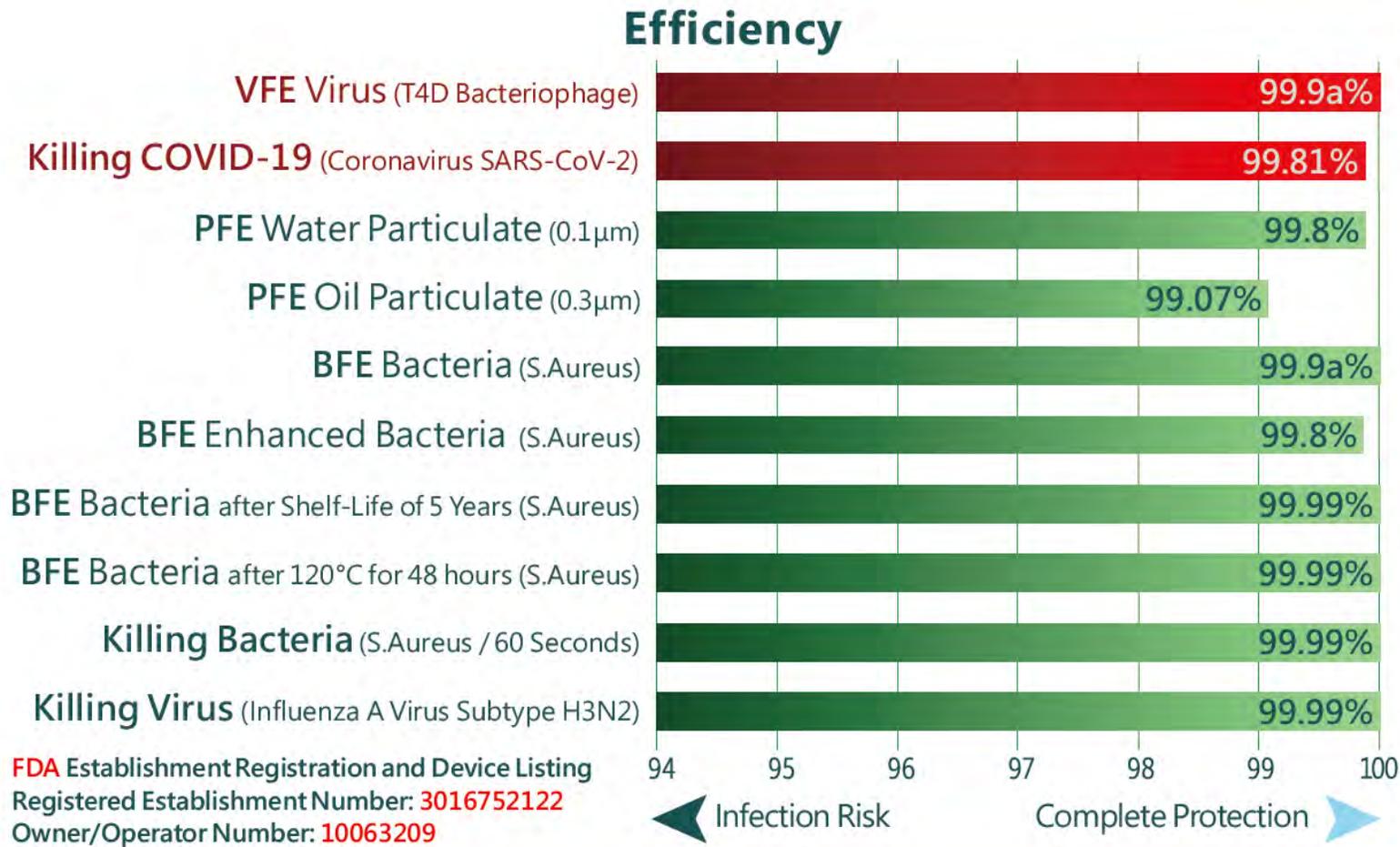
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于纤维基底间建立强正极聚合物纳米结构  
利用强正极吸附新冠病毒



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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



Viral Filtration Efficiency **99.9a%** / Killing **COVID-19 99.81%**

### Properties

Test	
Differential Pressure (mmH <sub>2</sub> O)	5
Fluid Resistance (mmHg)	160
Flame Spread (Second)	5
Microbio Cleanliness (cfu)	< 6
Shelf Life (Year)	5
ASTM F2101 Level 3 US Medical Face Masks Standard	
EN14683 TYPE IIR EU Surgical Masks Standard	
Core Filtration Material - Made in Taiwan / Hong Kong	
Formula - Food Additives Approved by World Health Organization (WHO)	
OOH technology pass chemical safety standards for baby textile products on EN ISO 21084:2019 EN ISO 18254:2016 EN ISO 14184:2011 JIS L 1041 DIN EN ISO 17070:2015 64 LF BG B 82.02-08 EN ISO 14389: 2014 US CPSC-CH-C1001-09.4	
Production process is determined to be a non-hazardous process according to EU Dangerous Preparation Directive 1999/45/EC	

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 <sup>a</sup>
2	>99.9 <sup>a</sup>
3	>99.9 <sup>a</sup>
4	>99.9 <sup>a</sup>
5	>99.9 <sup>a</sup>

<sup>a</sup> 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

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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

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# 建立新口罩标准 的重要性



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# 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**
-

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# 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
-

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**同心抗疫** *Together,*  
*We Fight the Virus!*

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