



interfacial transportation and separation of airborne components

2021 Bulletin @ Dept. of Building Science, Tsinghua University

<http://jmo-lab.net>



Team lunch at a hotspot restaurant

志向

追求乐趣

提升人品

展现才华

贡献人类

Slogans

Seek for funs!

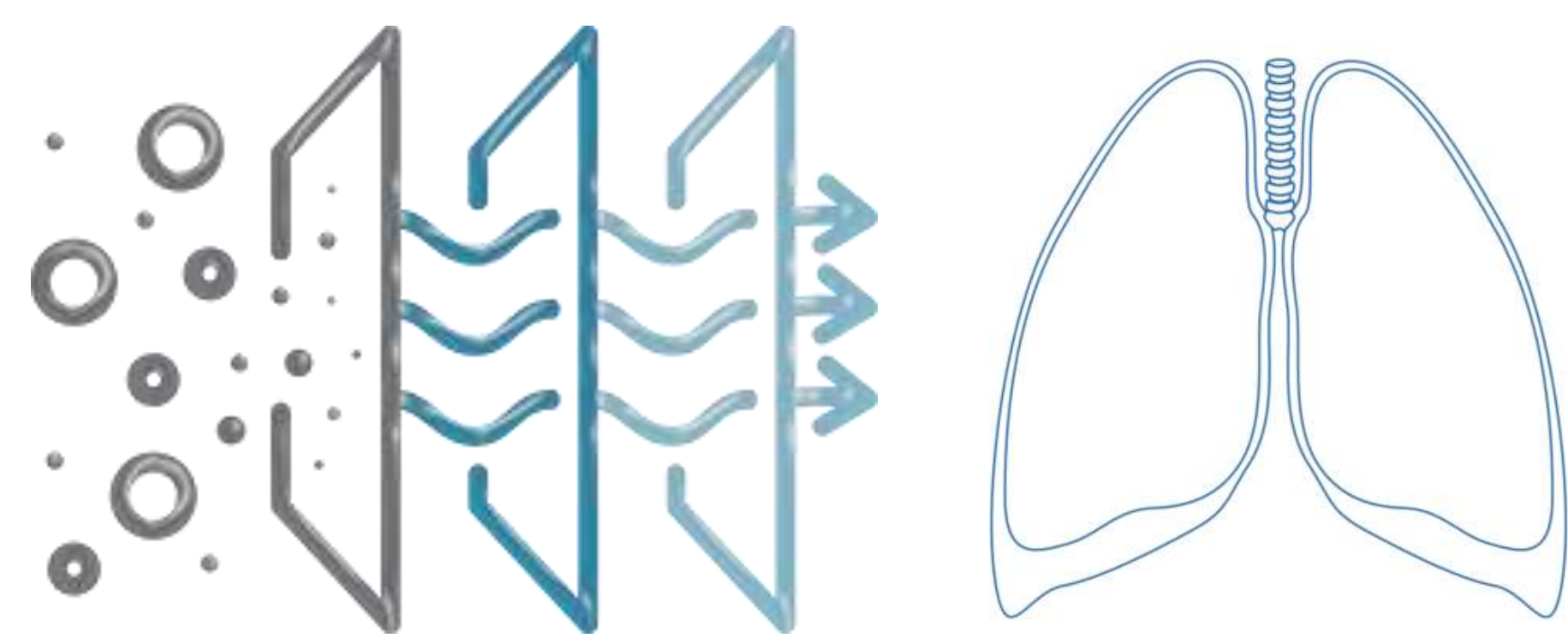
Improve your personality!

Show your talents!

Contribute to humanity!

Tsinghua Spirit

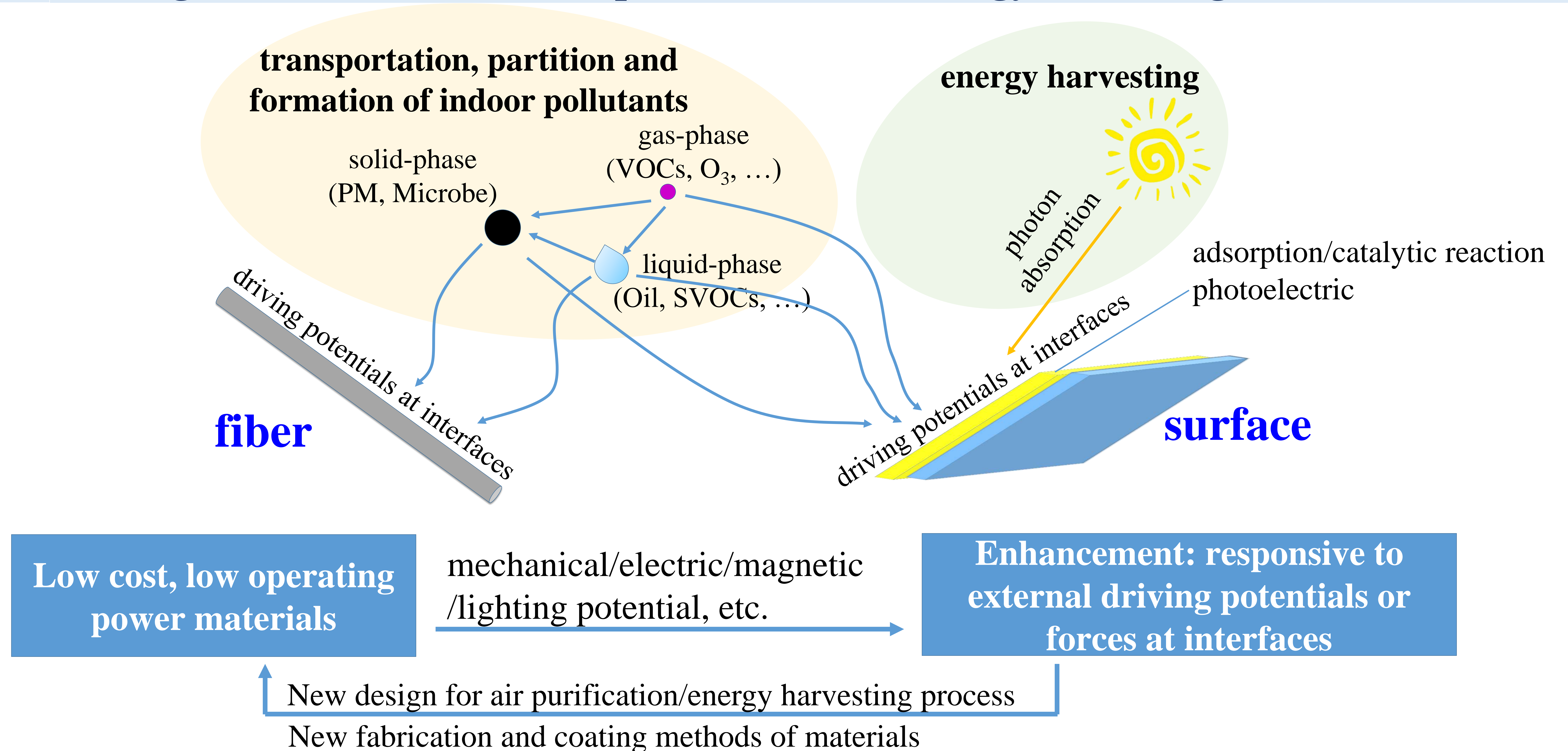
“Actions Speak Louder than Words” (行勝於言)

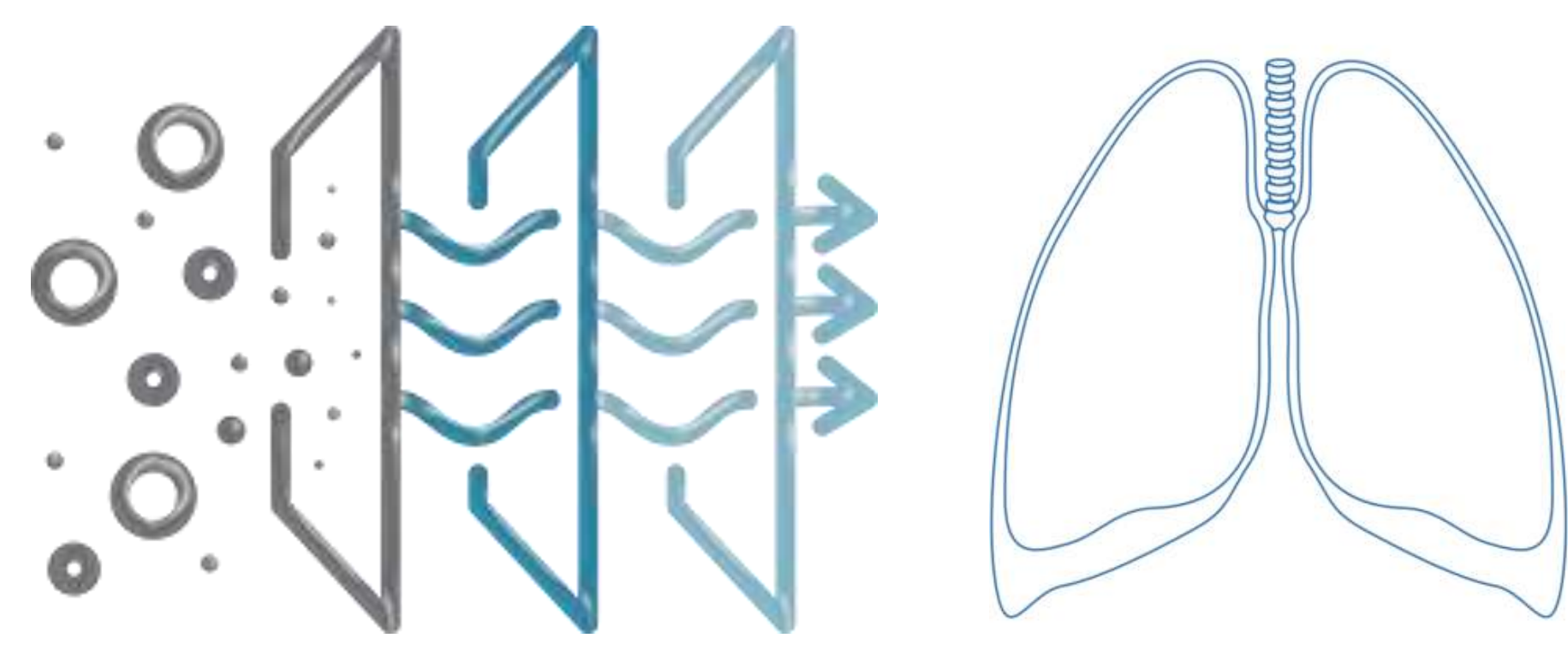


Researches Activities Funs

Scopes

- Indoor air pollution sampling, analysis and risk assessment for human health
- Heterogeneous interfacial, physical/chemical processes in indoor environments
- Design and fabrication of air purification and energy harvesting material/surface



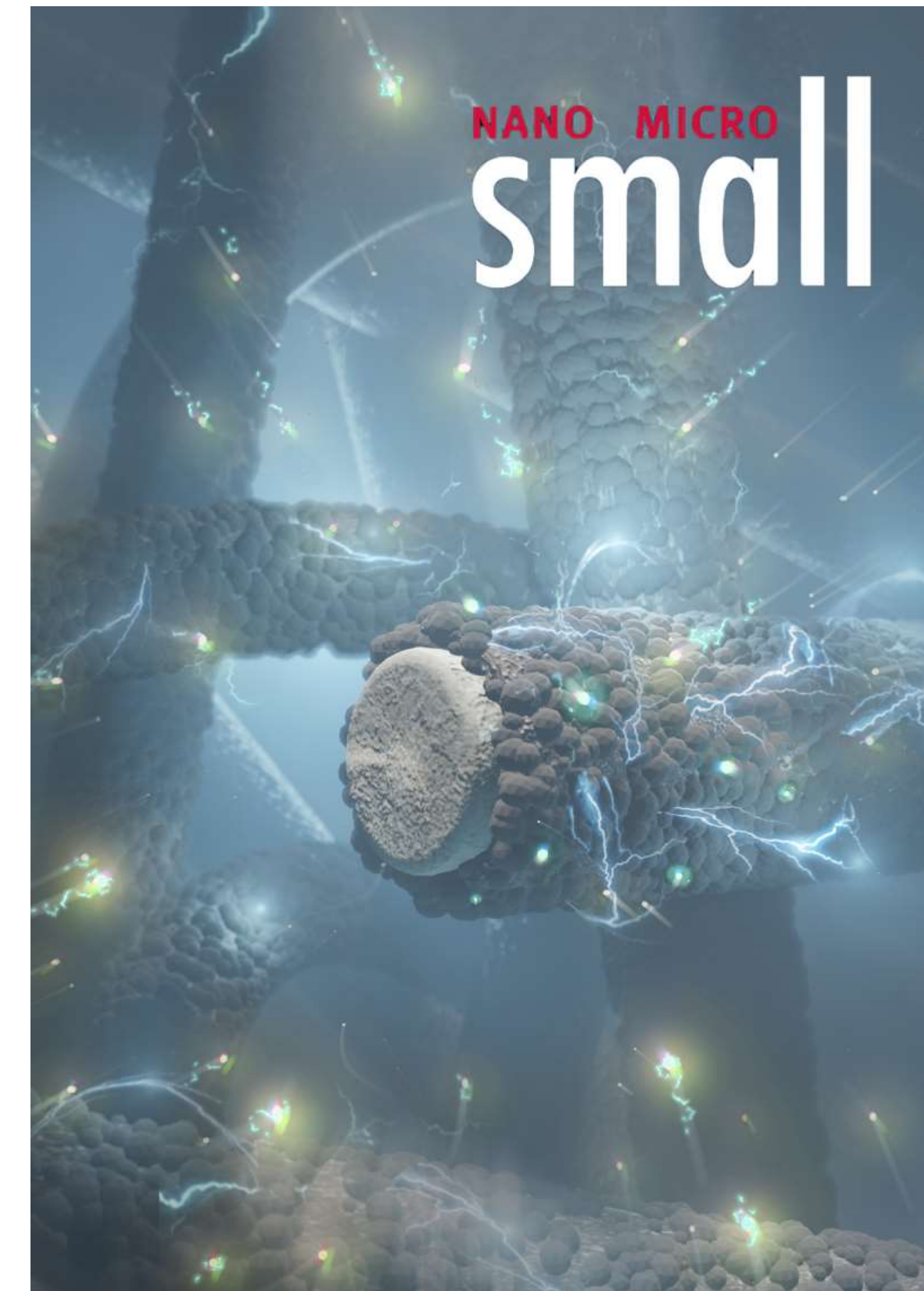
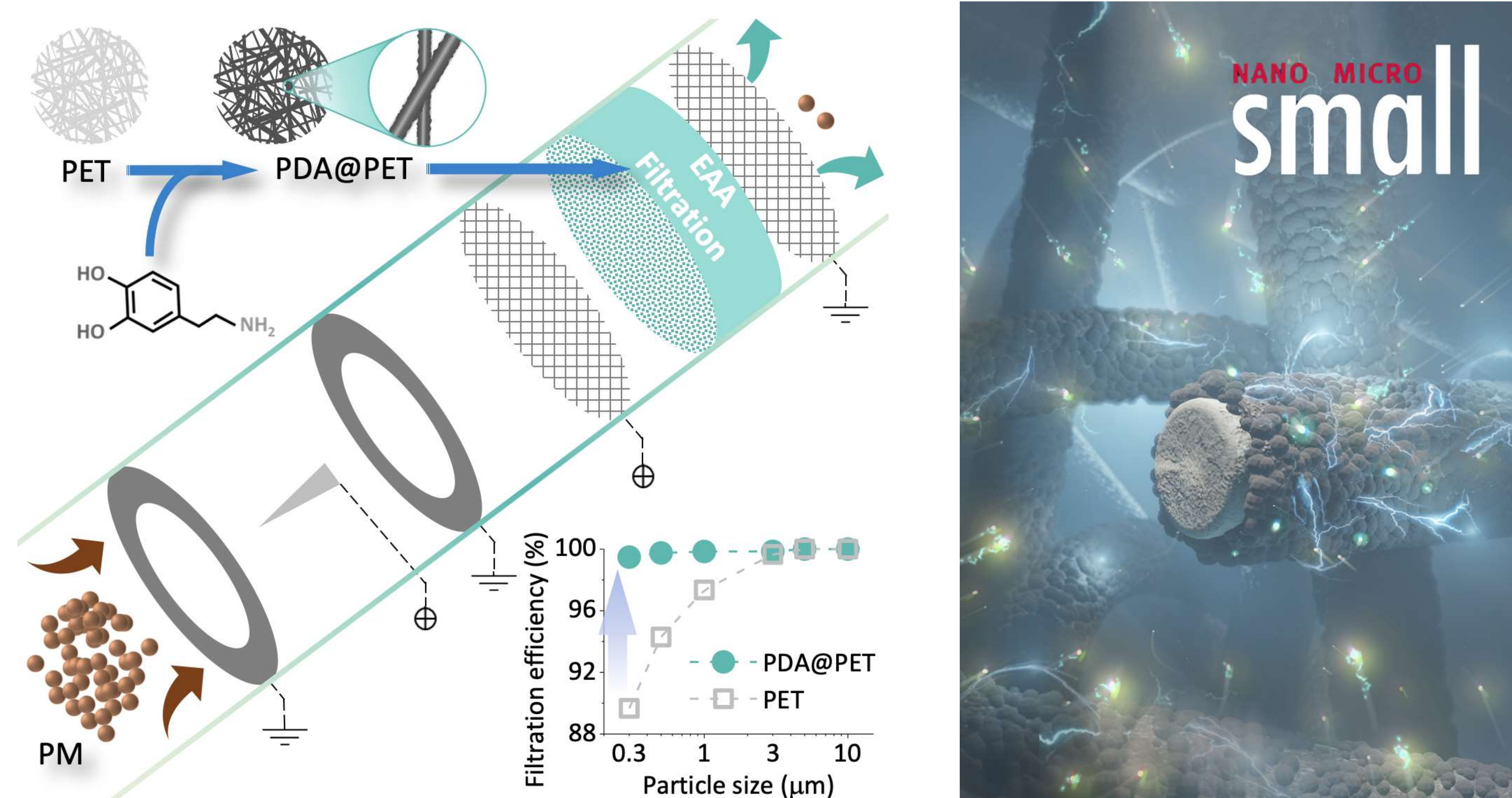


Researches Activities Funs

Electrostatically assisted air coarse filtration (EAA) by Enze TIAN

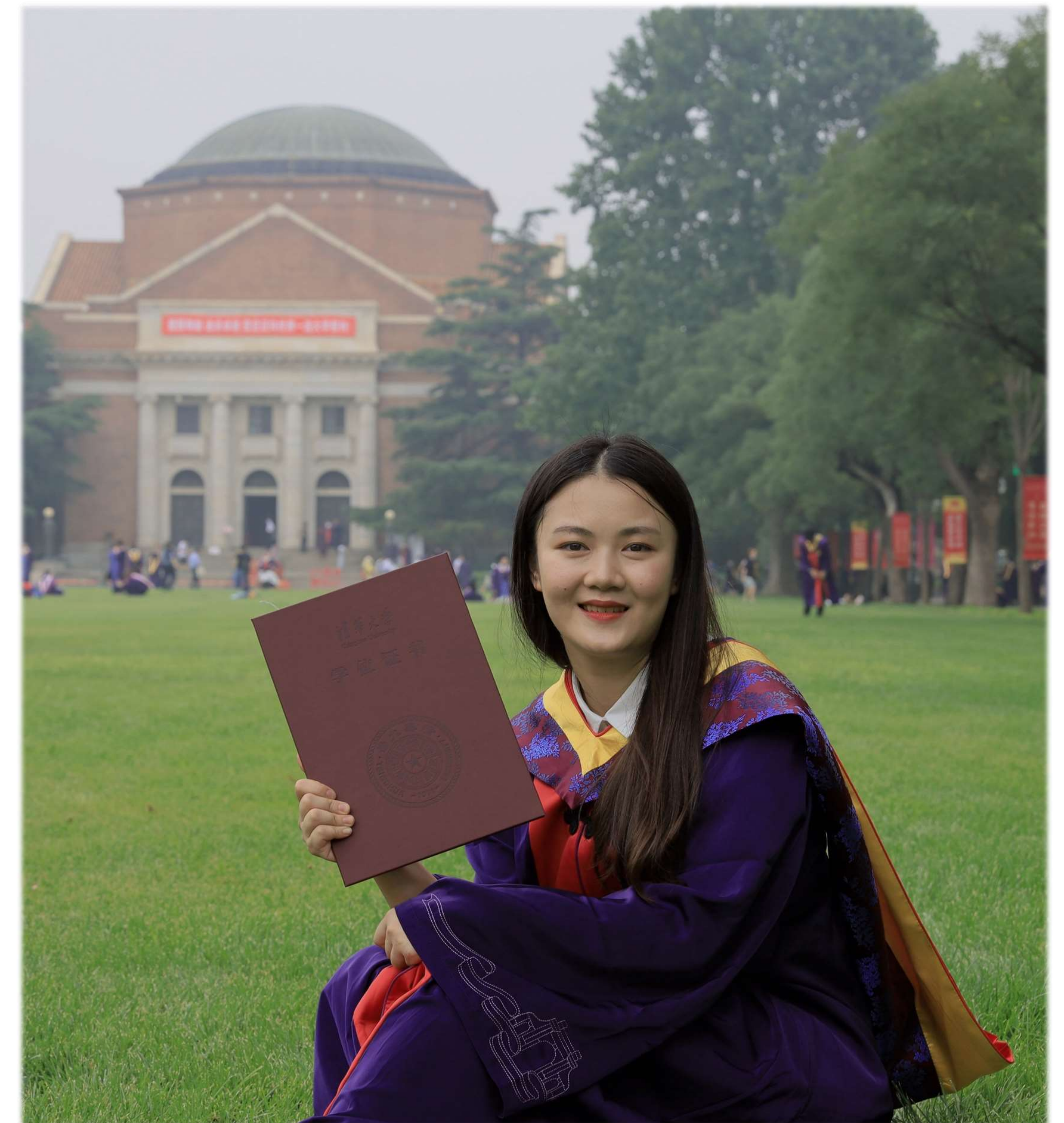
We developed a two-stage electrostatically assisted air (EAA) filtration device with stage-I plasma charging and stage-II polydopamine coated polyethylene terephthalate (PET) coarse filters. The filter showed a high filtration efficiency of 99.48% for 0.3 μm particles, and low air resistance of 9.5 Pa at 0.4 m/s filtering velocity. The EAA filter showed steadily high filtration efficiency in 30-day running.

Tian EZ, Yu QP, Gao YL, Wang H, Wang C, Zhang YP, Li BH, Zhu MF, Mo JH*, Xu GY*, Li J*, Small, 2021, 17, 33: 2102051. **Inside Back Cover.** <https://doi.org/10.1002/sml.202102051>



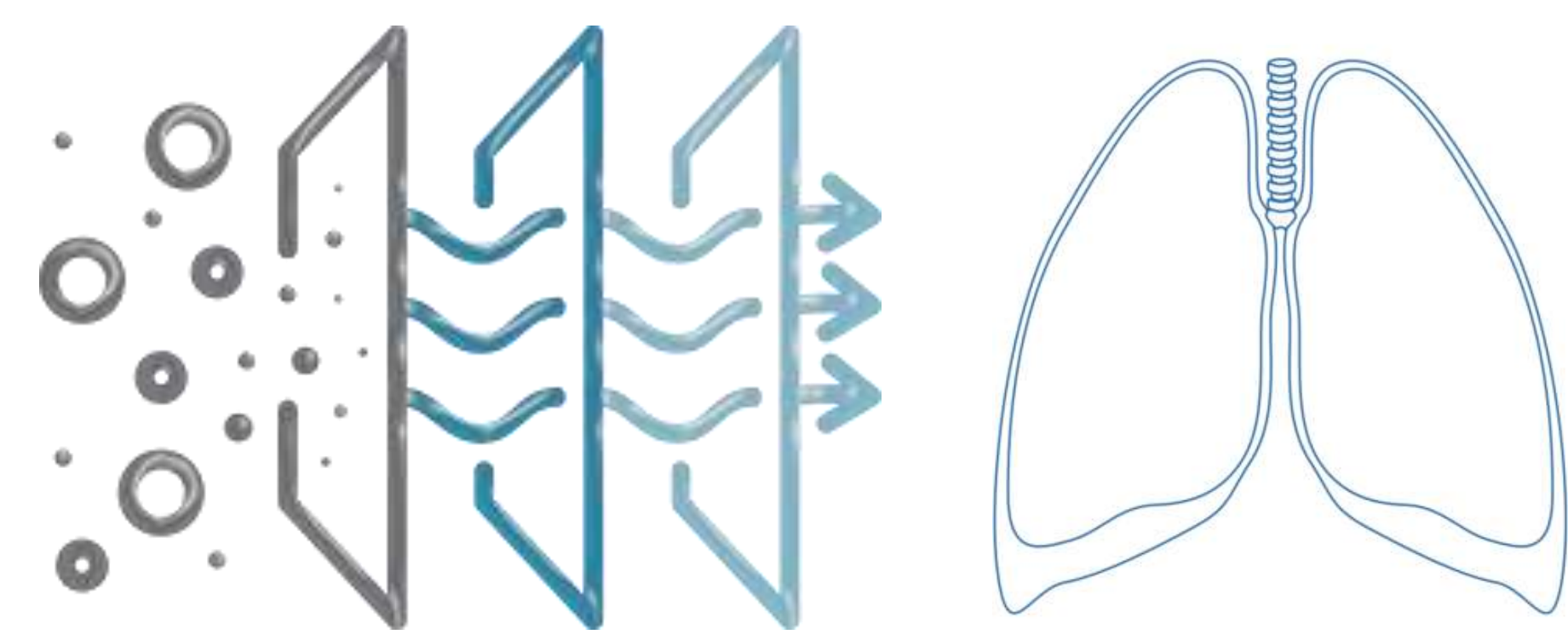
Masks, respirators and their sterilizing methods by Enze TIAN

- Fast-evaluating nontraditional N95 respirators during the COVID-19 pandemic.
Plana D[#], Tian EZ[#](co-first), ..., Mo JH, LeBoeuf NR*, Li J*, Sorger PK*, BMC Infectious Diseases, 2021, 21(1): 712.
- UV light radiation and of SteraMist ionized hydrogen peroxide technology is found practicable methods not degrading the filtration efficiency of personal protective equipment.
Cramer AK, ..., Tian EZ, Mo JH, Sorger PK*, et al., Scientific Reports, 2021, 11, 2051
Weaver DT, ..., Mo JH, Tian EZ, et al., PLOS ONE, 2021, 16(7): e0241734.
- The design, prototyping, validation and user testing of locally manufactured Powered air-purifying respirators.
Kothakonda A, ..., Tian EZ, Sorger PK*, et al., Frontiers in Bioengineering and Biotechnology, 2021, 9:725.



Enze received her doctorate from Tsinghua University.

She got the Excellent PhD student award at the International Conference for Global Chinese Academia on Energy and Built Environment (Chengdu, China), 2021, and got the Distinguished Doctoral Thesis Award, School of Architecture, Tsinghua University

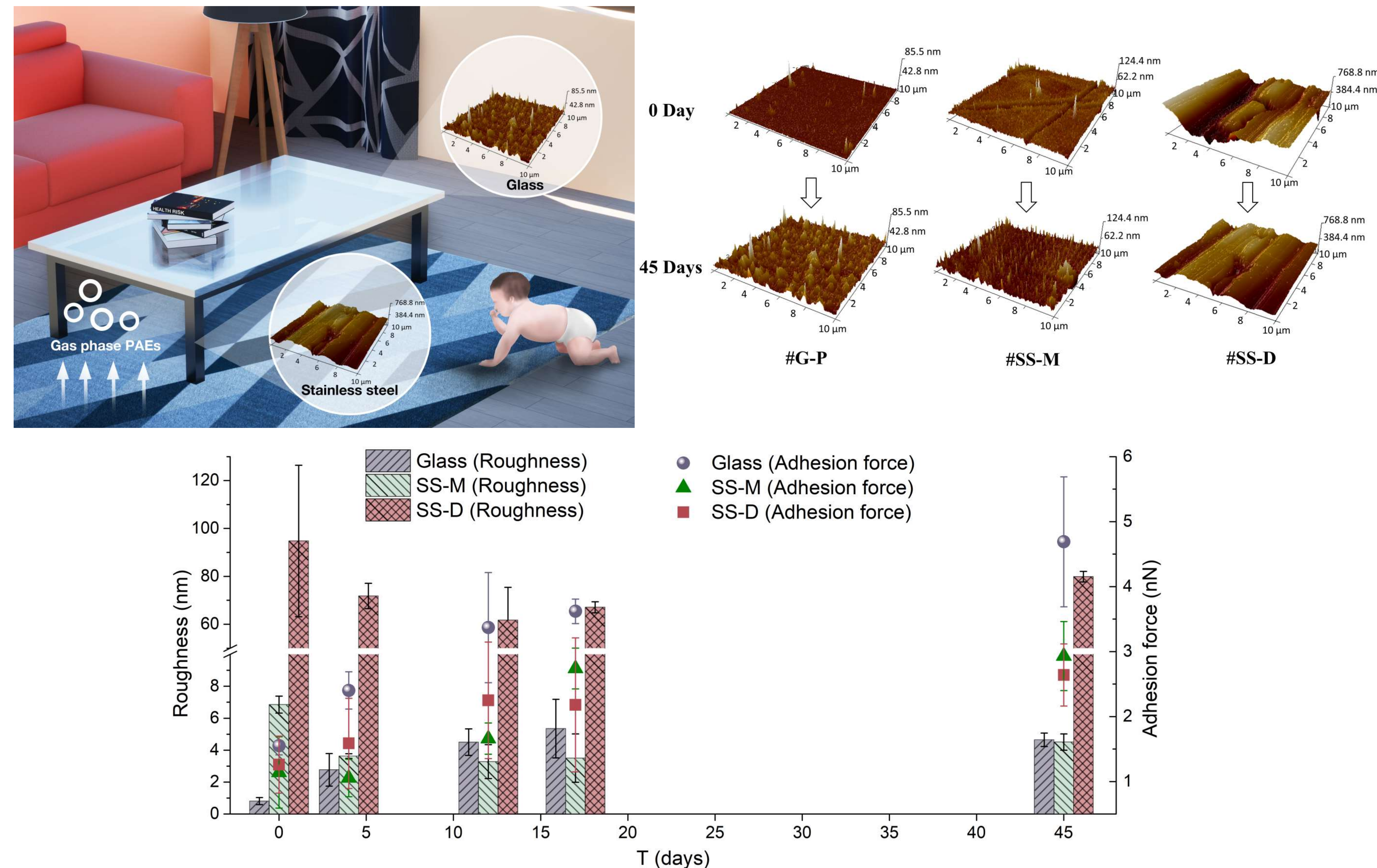


Researches Activities Funs



Zhuo CHEN is giving a work report during his summer social practice in Panjin, Liaoning Province, China

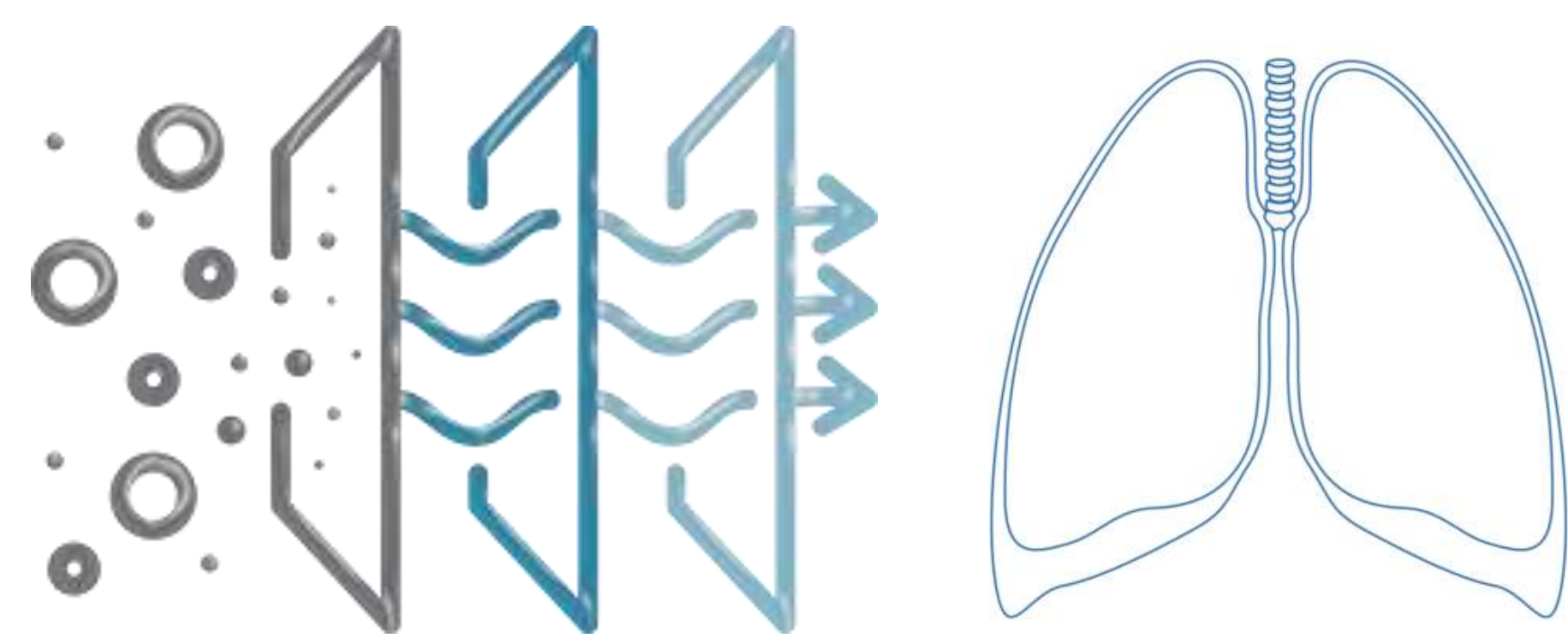
Partitioning of PAEs on indoor impermeable surfaces: A microscopic view of the sorption process, by Zhuo CHEN



In this work, we observed the microscopic growth process of PAE organic films on impermeable substrates, including glass and stainless steel. Organic films were formed on the flat surface and also around the inherent nano-peaks on glass surfaces to broaden and heighten the peaks. Valleys on stainless steel substrates provided active sites for PAE molecules leading to films formed in valleys.

Zhuo Chen, Qianying Wu, Ying Xu, Jinhan Mo, 2022. Journal of Hazardous Materials 424, 127326.

<https://doi.org/10.1016/j.jhazmat.2021.127326>

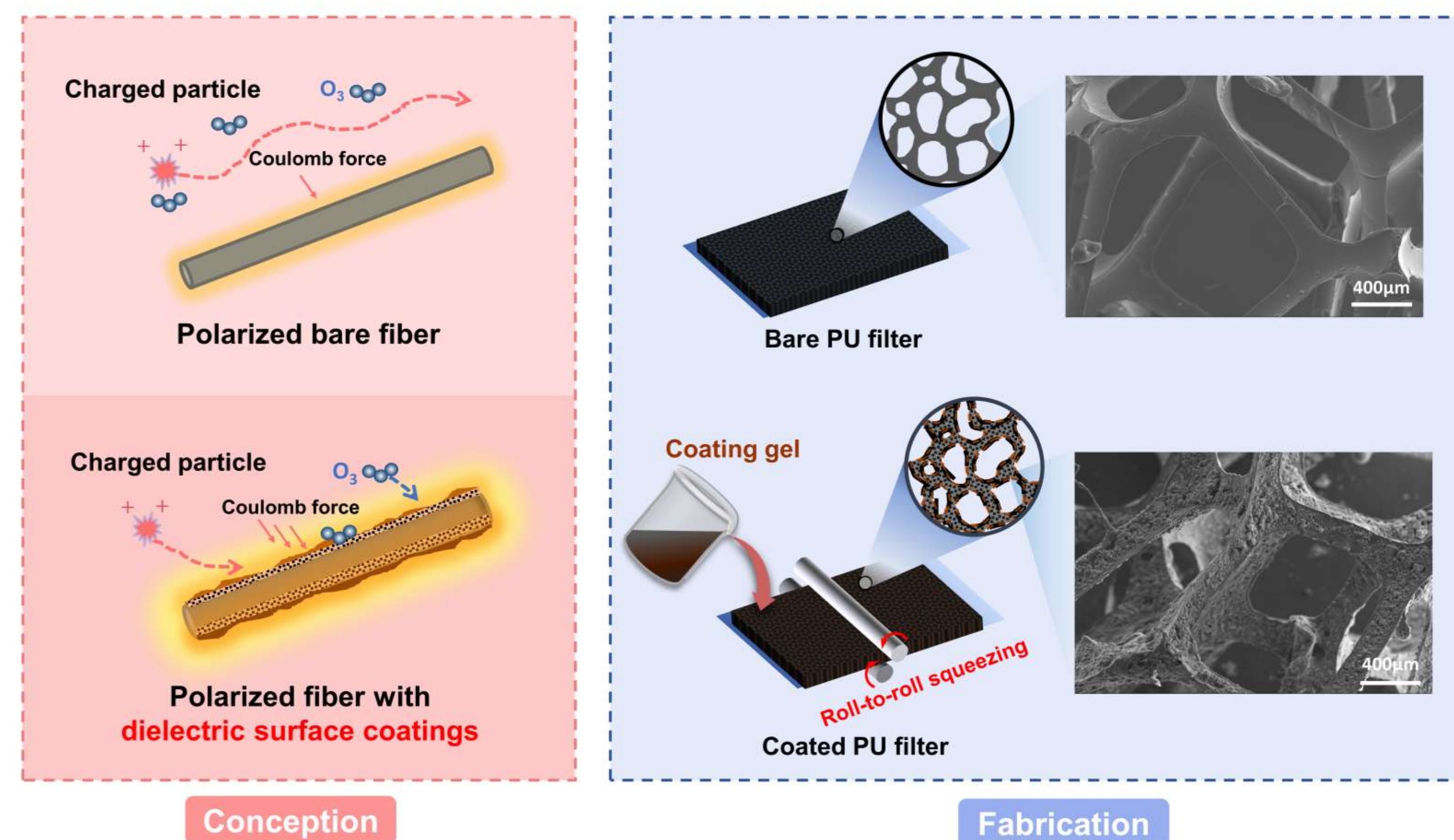


Researches Activities Funs

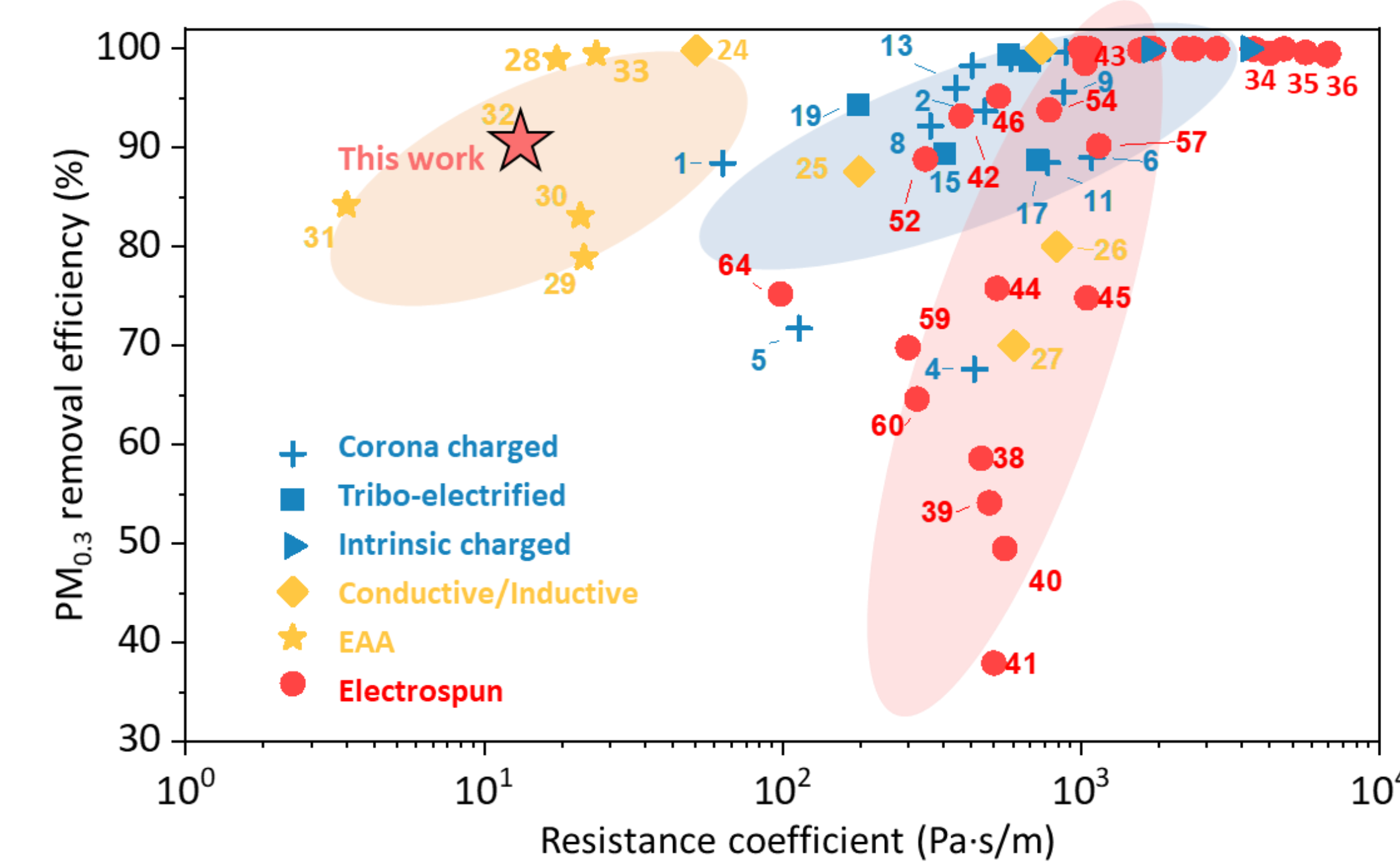
Electrically responsive filters for particle and ozone removal by Yilun Gao

- We designed a dielectric-coated fiber structure and fabricated electrically responsive polyurethane (PU) coarse filters to remove particles by utilizing the Coulomb force. The electrical responsiveness endowed the filters with UFPs removal efficiency of 90.50%, ultralow ~ 13.0 Pa air resistance, and potential to removal ozone.

Gao YL, Tian EZ, Mo JH, ACS ES&T Engineering, 2021, 1, 10: 1449-1459. <https://doi.org/10.1021/acsestengg.1c00186>



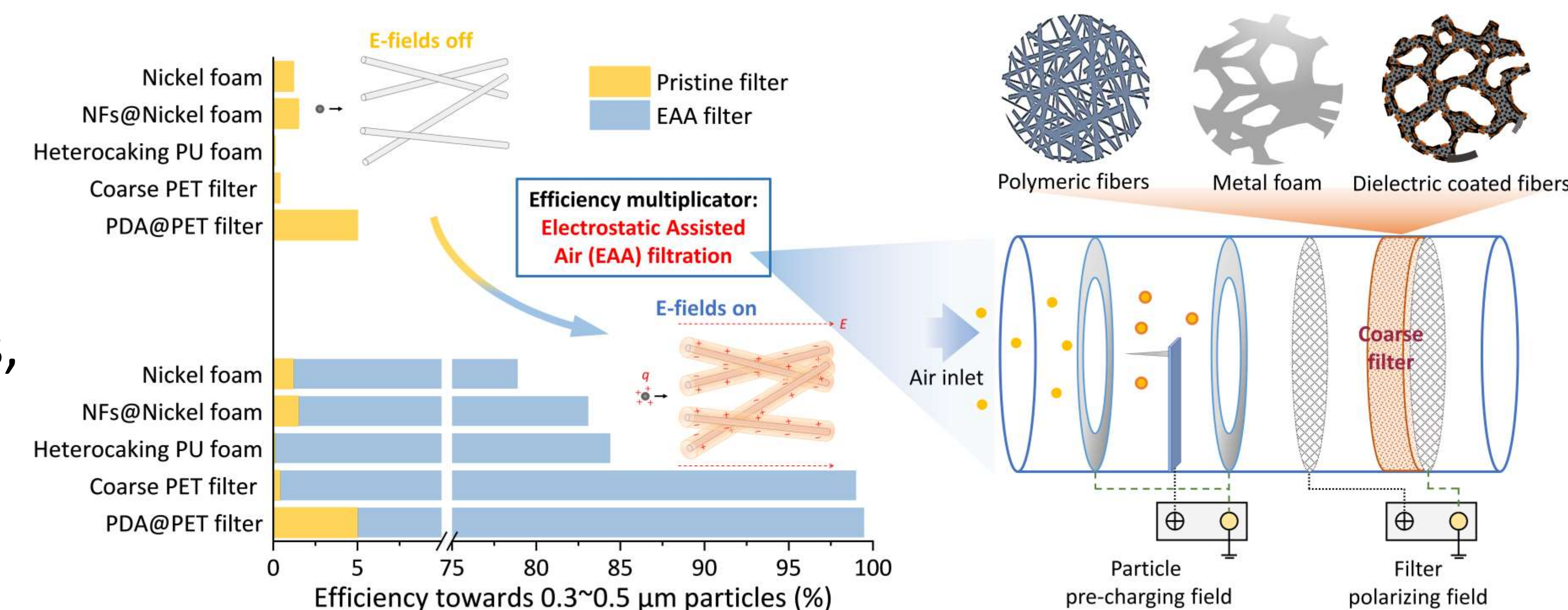
Achieving more than 90% efficiency under relatively low air resistance



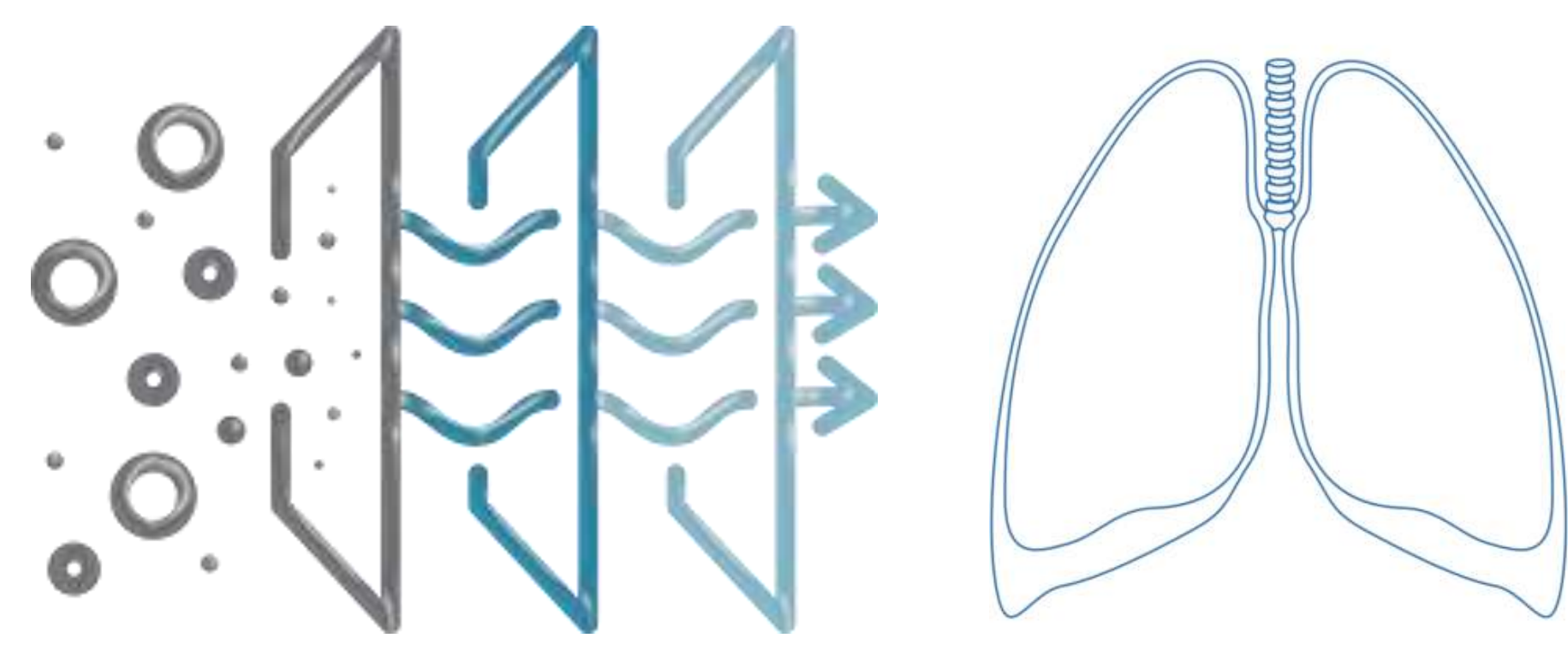
1. *Sci. Total. Environ.* (2015) 533, 266
2. *RSC Adv.* (2018) 8,7932
19. *Adv. Func. Mater.* (2019) 29, 1903633
20. *ACS Appl. Mater. & Inter.* (2018) 10,7126
23. *J. of Hazard. Mater.* (2018) 351, 29
24. *ACS Appl. Mater. & Inter.* (2017) 9, 6401
26. *ACS Appl. Mater. & Inter.* (2019) 6, 1801832
33. *Small* (2021) 17, 2102051
43. *Nature Communications* (2015) 6 (1), 6205
44. *Journal of Memb. Sci.* (2021) 635, 119463
60. *Adv. Func. Mater.* (2020) 30 (13), 1909554
66. *Adv. Mater.* (2020) 32 (29), 2002361

A systematically review for the performance of electrostatic air filters

- We made a systematic review about the fabrication, principles and performance for different categories of electrostatic air filters, and the work is under review.



Yilun was wandering outside in Beijing's spring. He got the Best Paper Award at 10th Indoor Environment and Health Branch Conference (IEHB 2021), Wuhan, China.

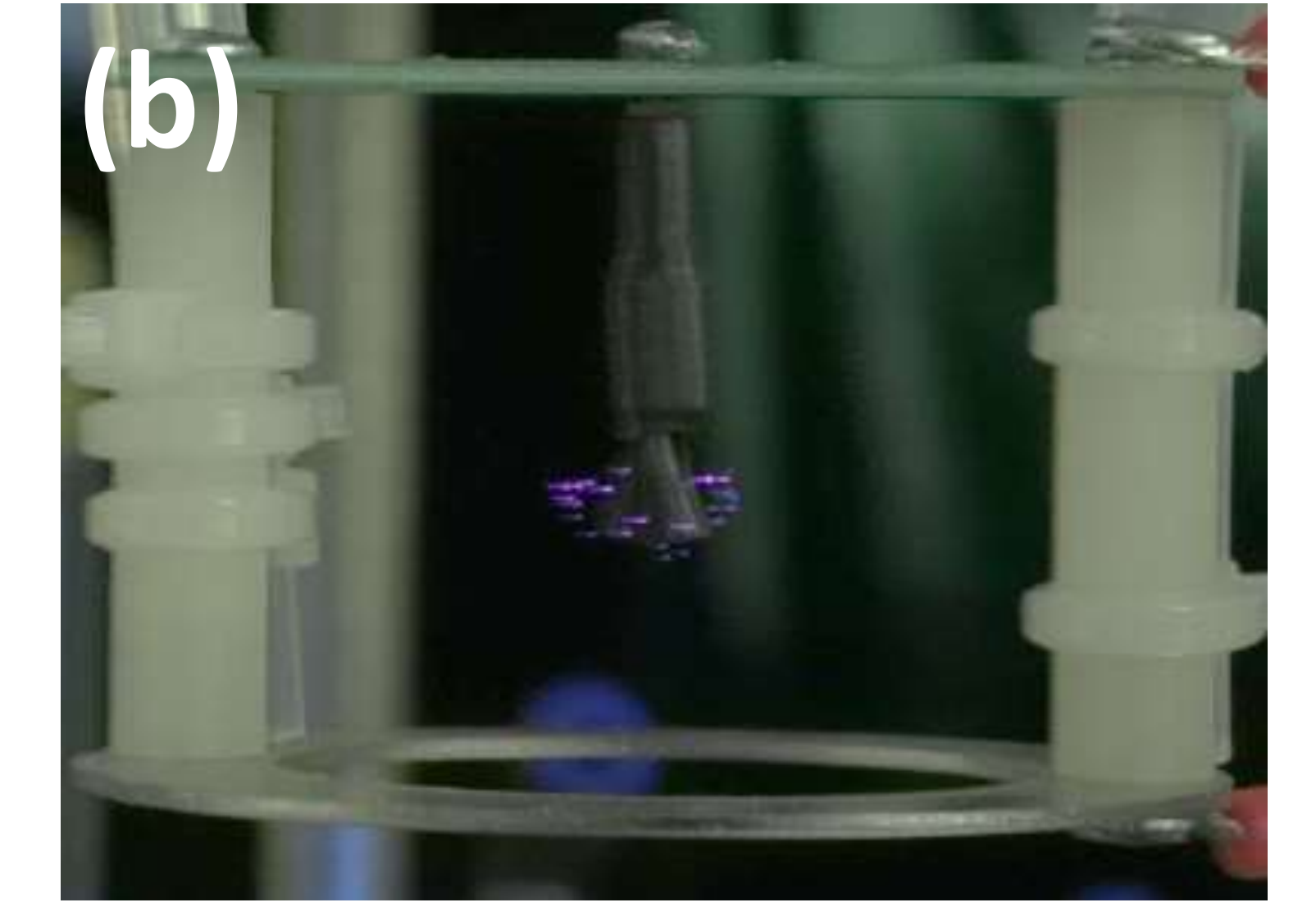
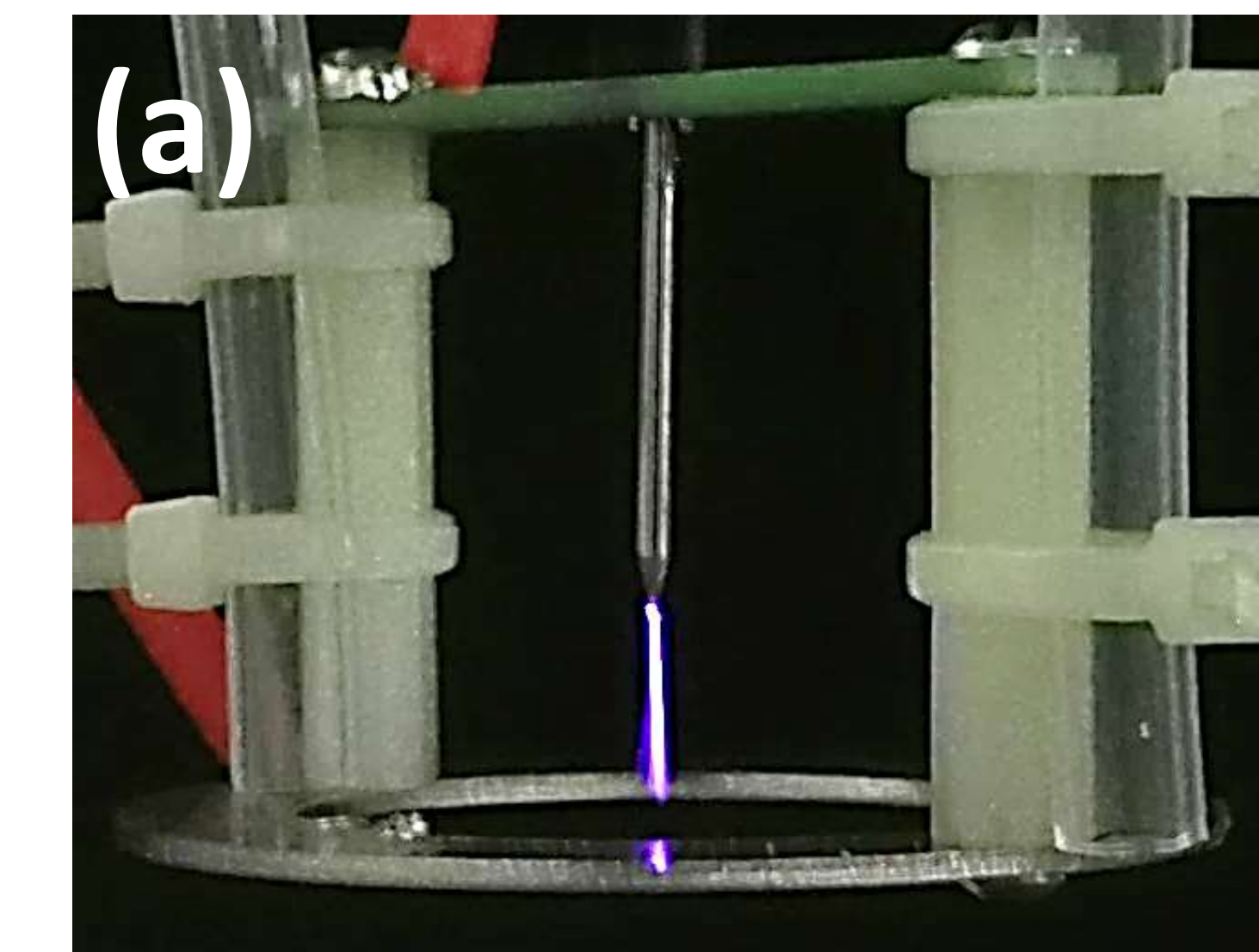
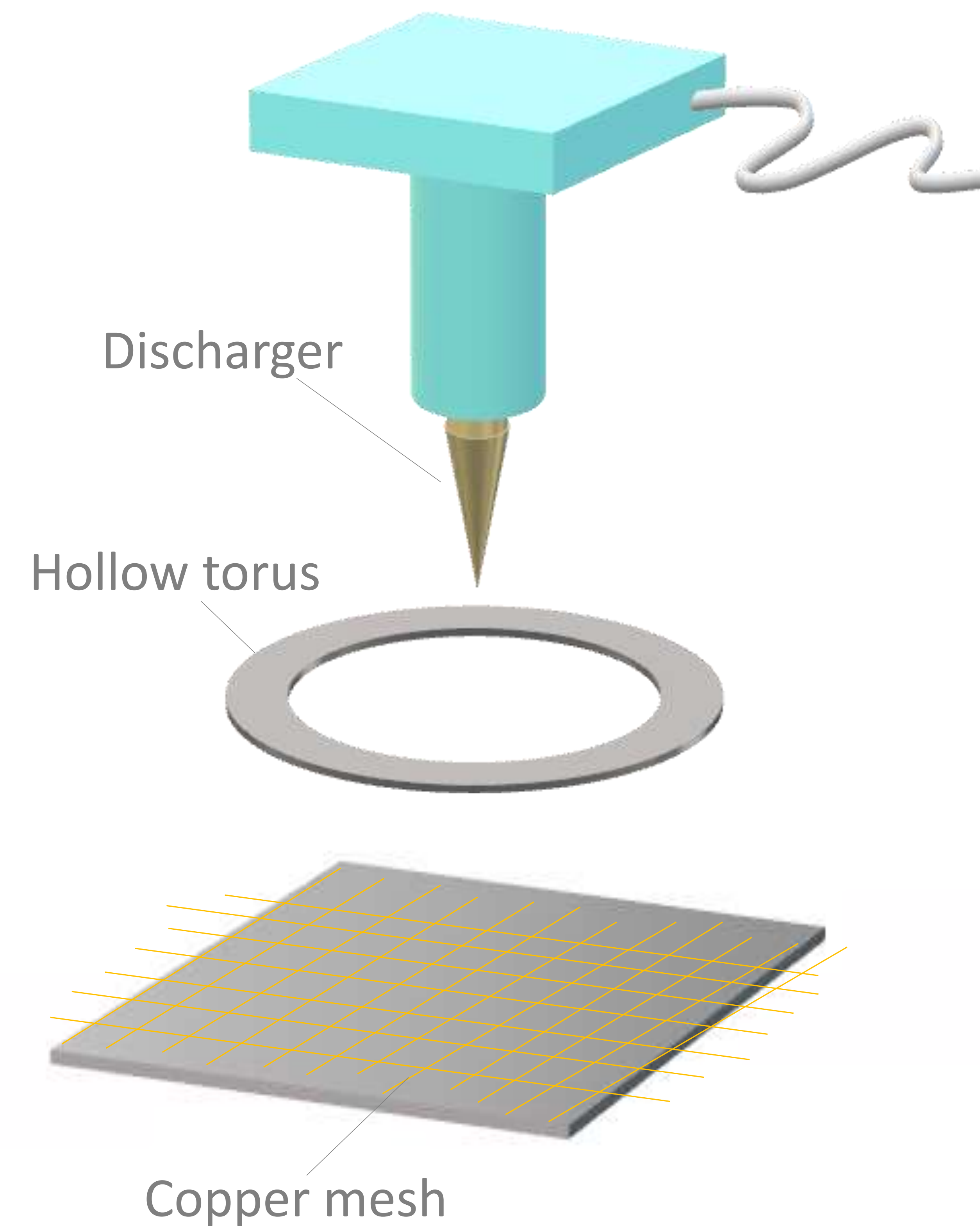


Researches Activities Funs

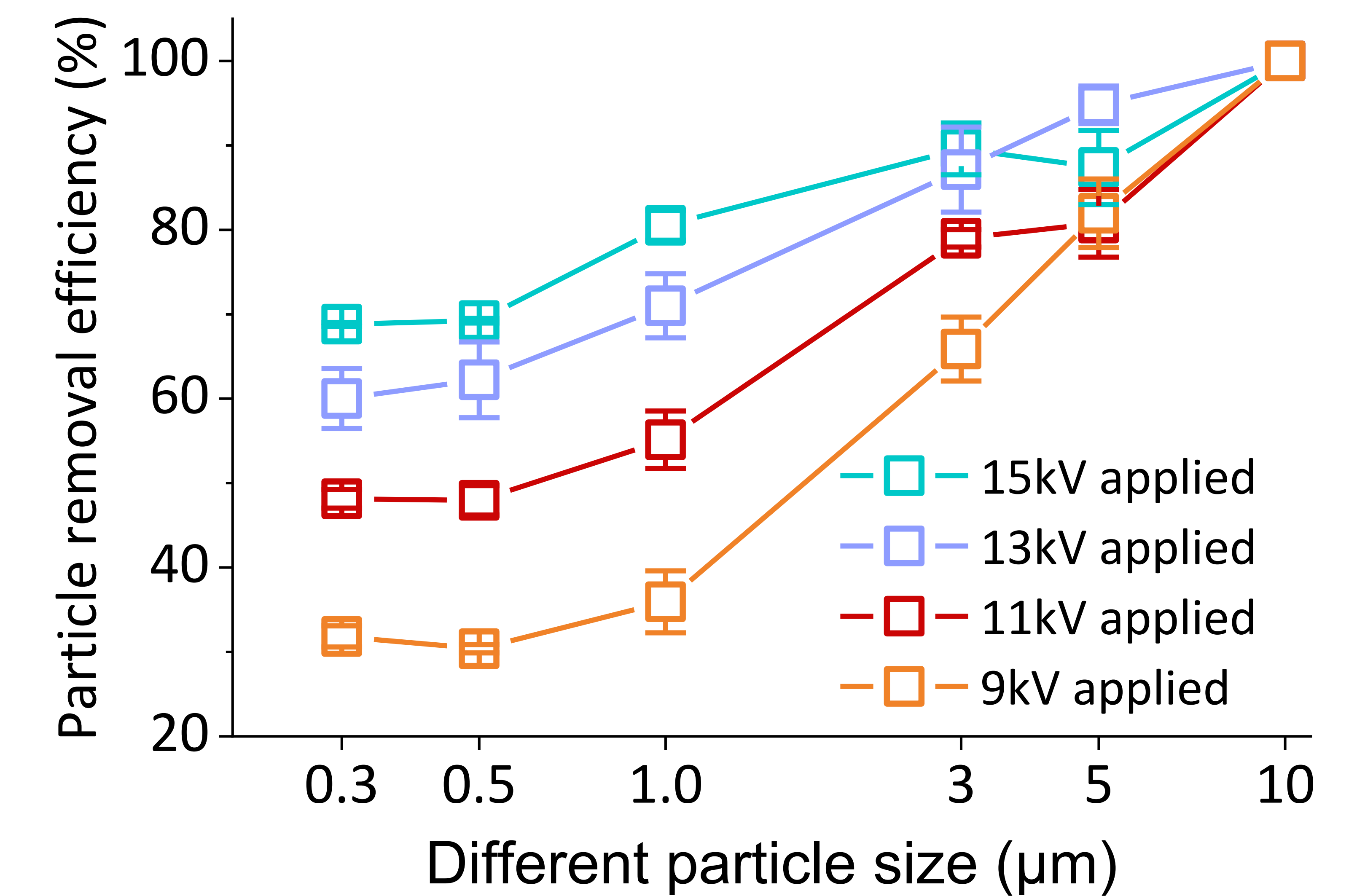


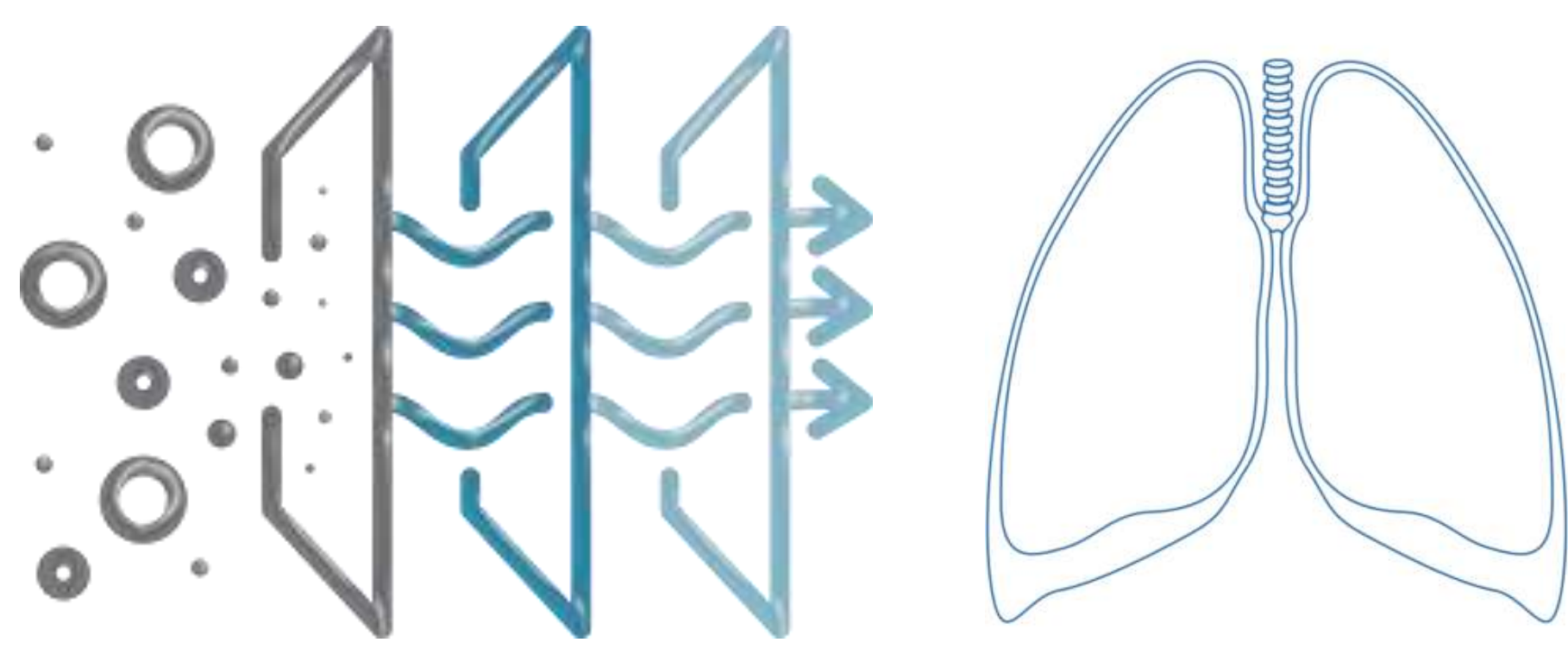
Yuting and the Shanghai Oriental Pearl TV Tower
His hair is charged up.

**Developed a two-stage discharger for particles charging:
higher particle removal efficiency by Yuting GU**

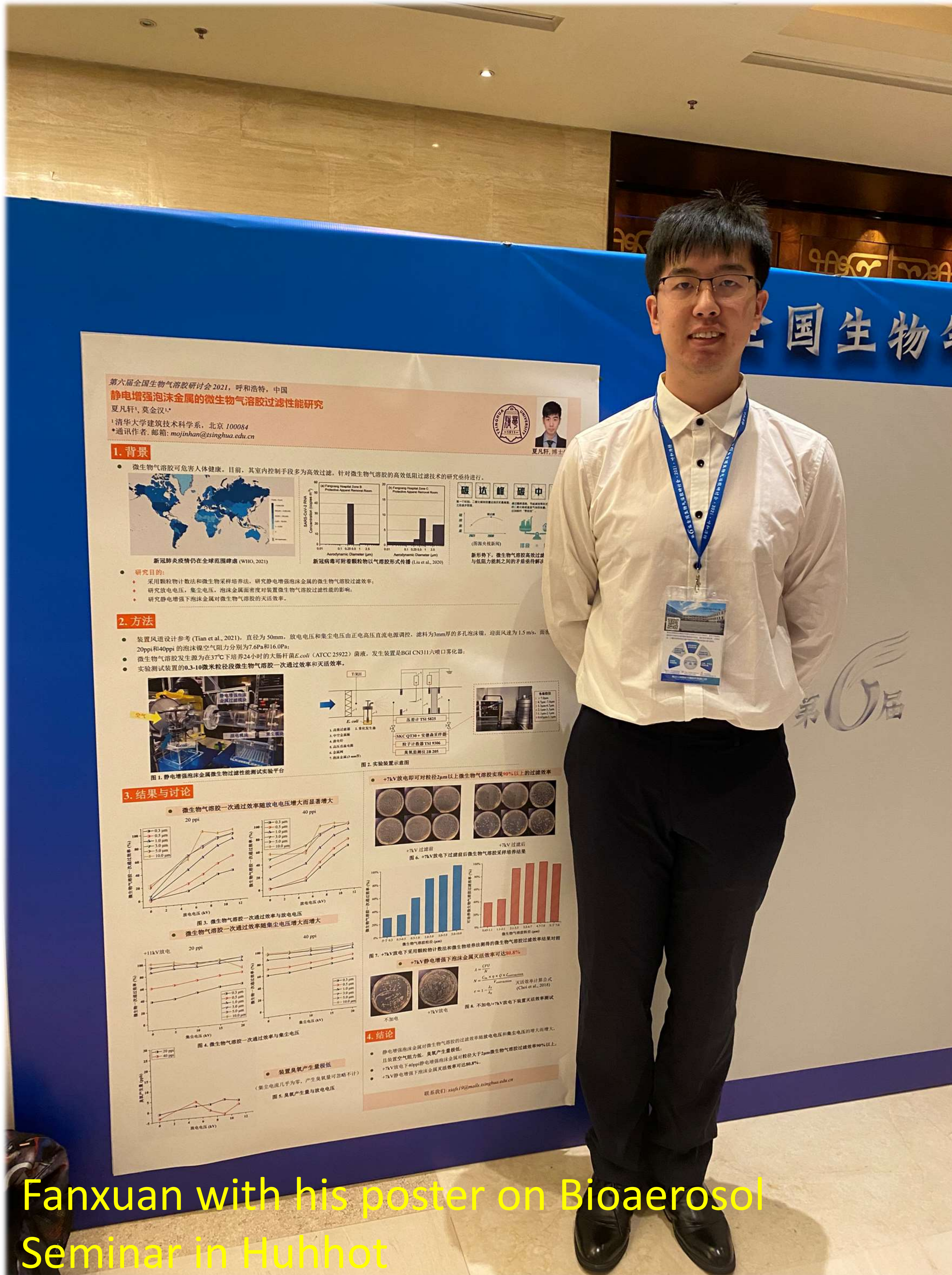


Discharge process with 15kV applied voltage
(a) Metal pin (b) Carbon brush



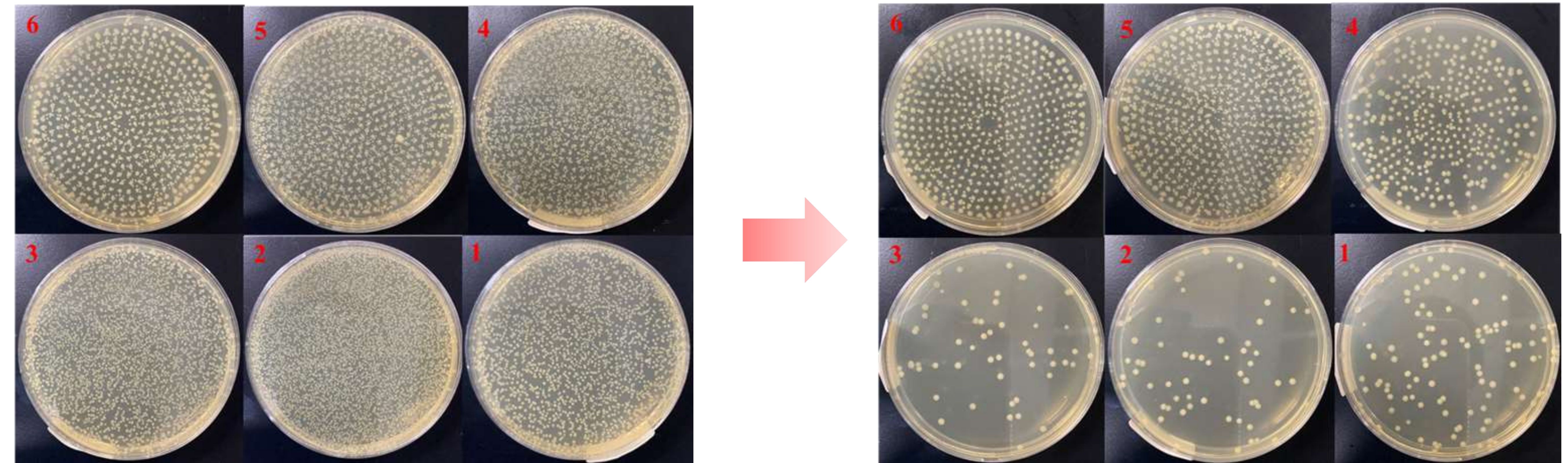


Researches Activities Funs

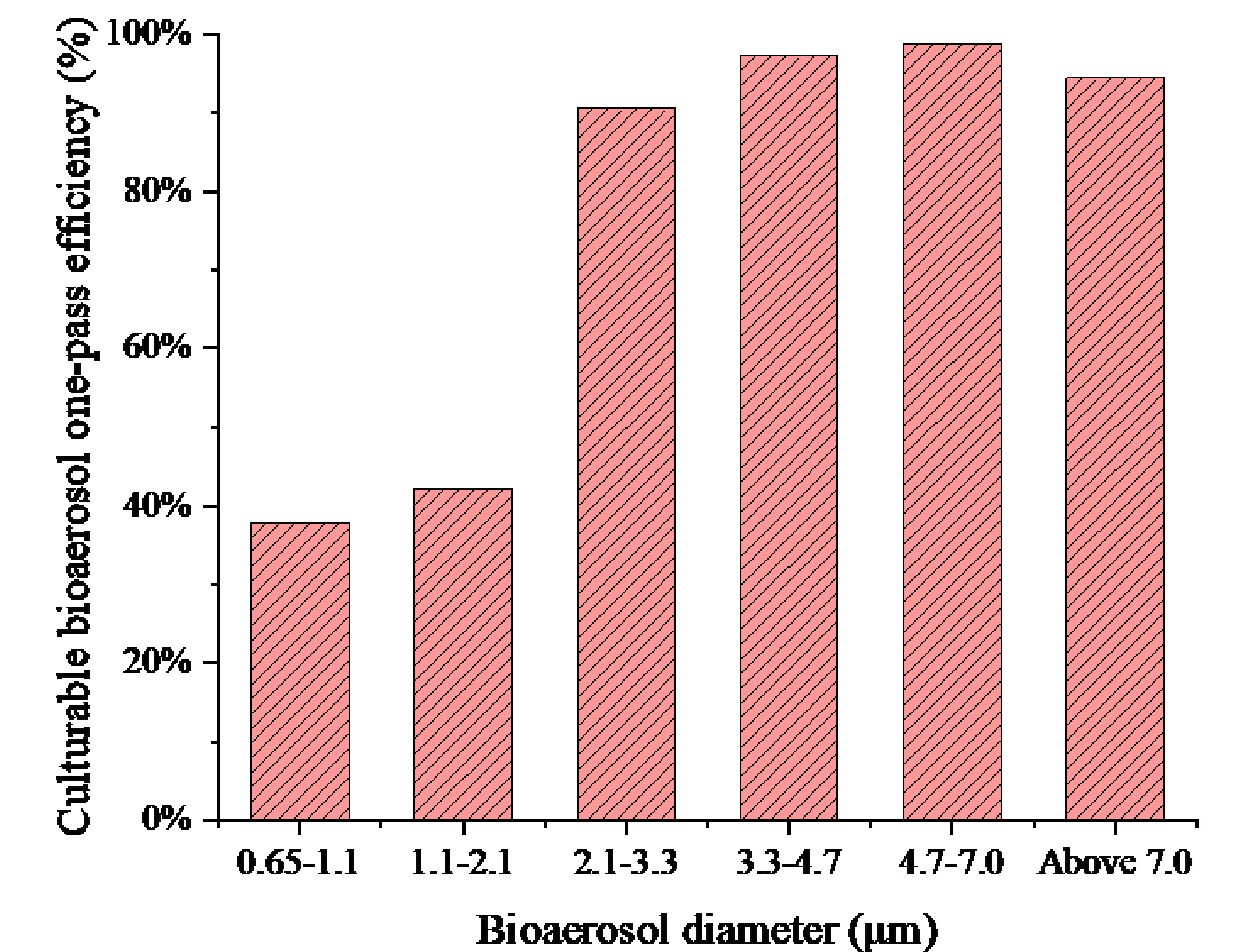
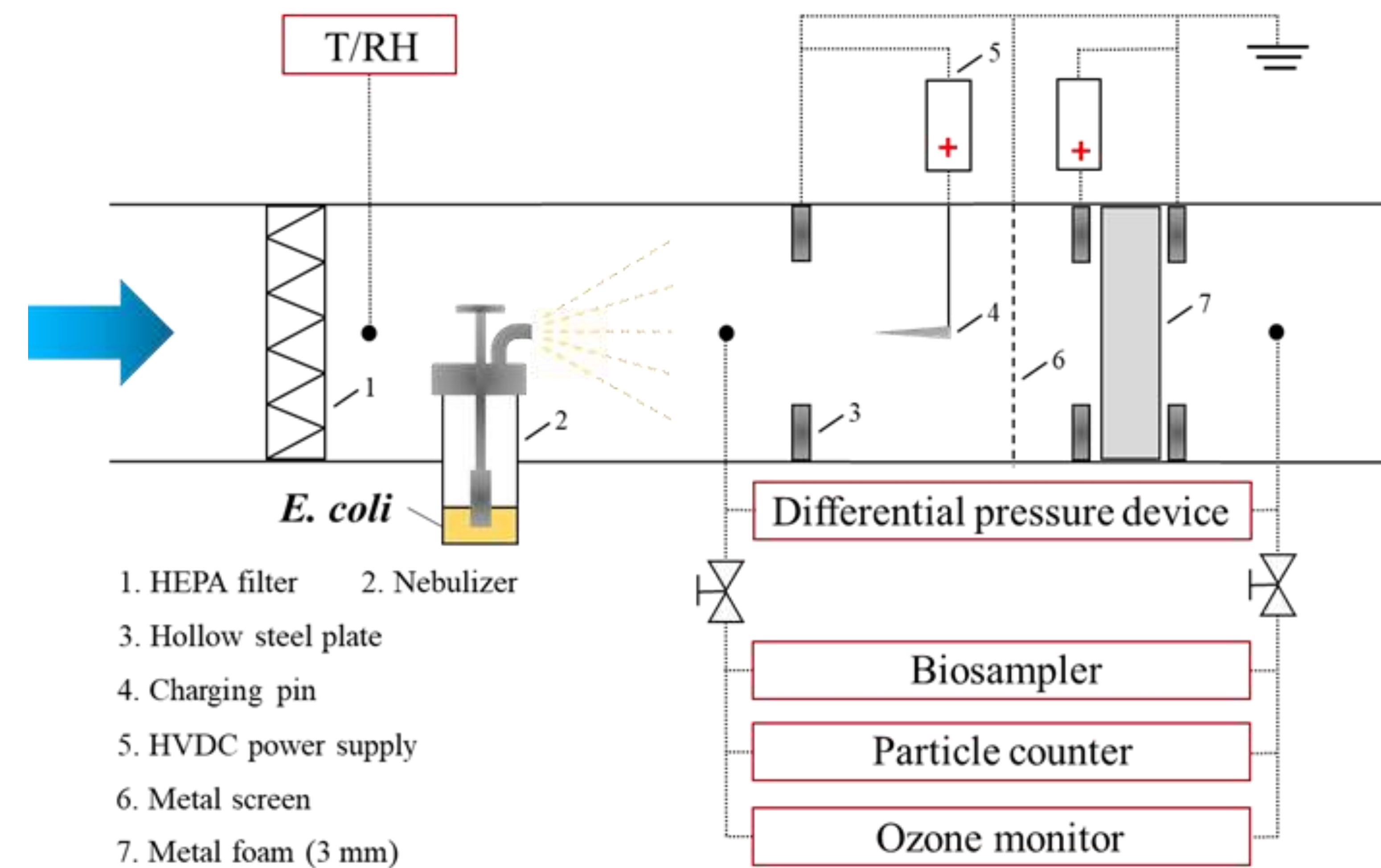


Fanxuan with his poster on Bioaerosol Seminar in Huhhot

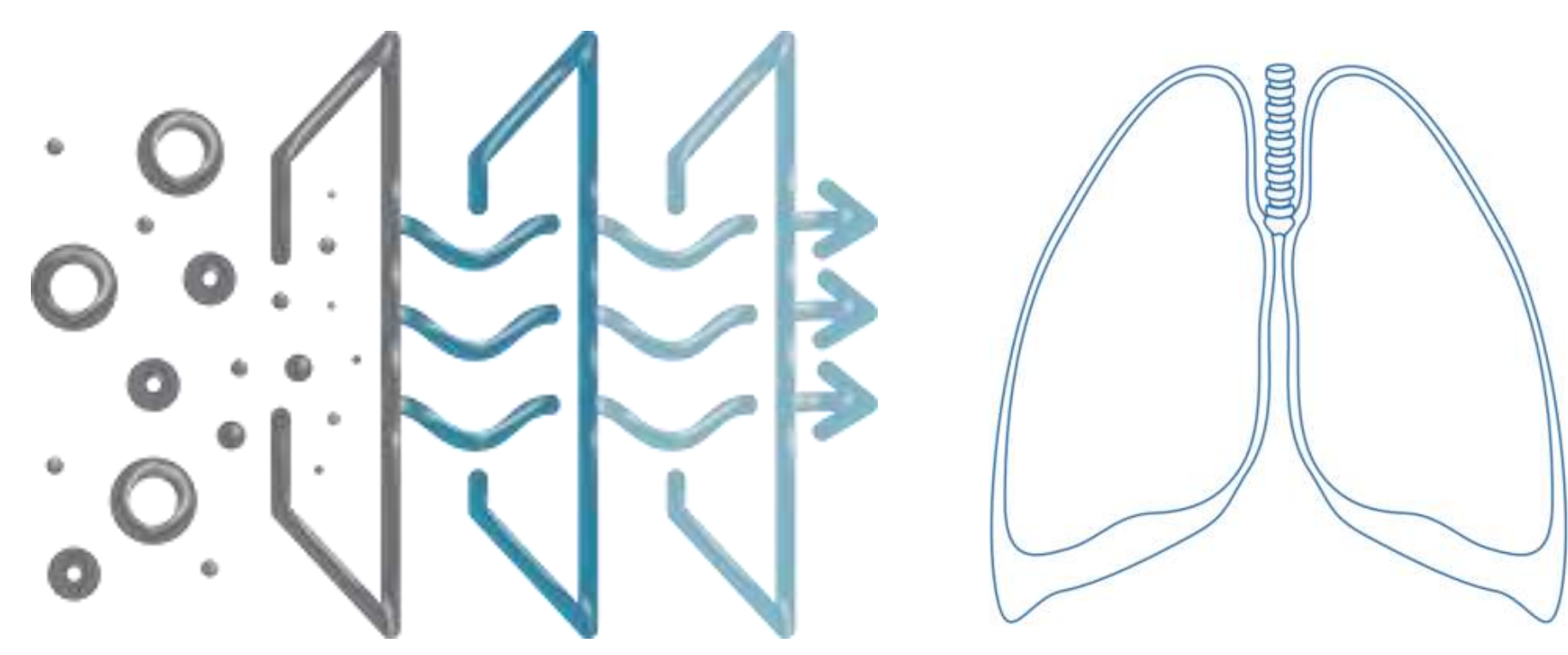
Bioaerosol Removal Performance of the Electrostatically Assisted Metal Foam Filter by Fanxuan Xia



Sampled bioaerosols before and after filtration

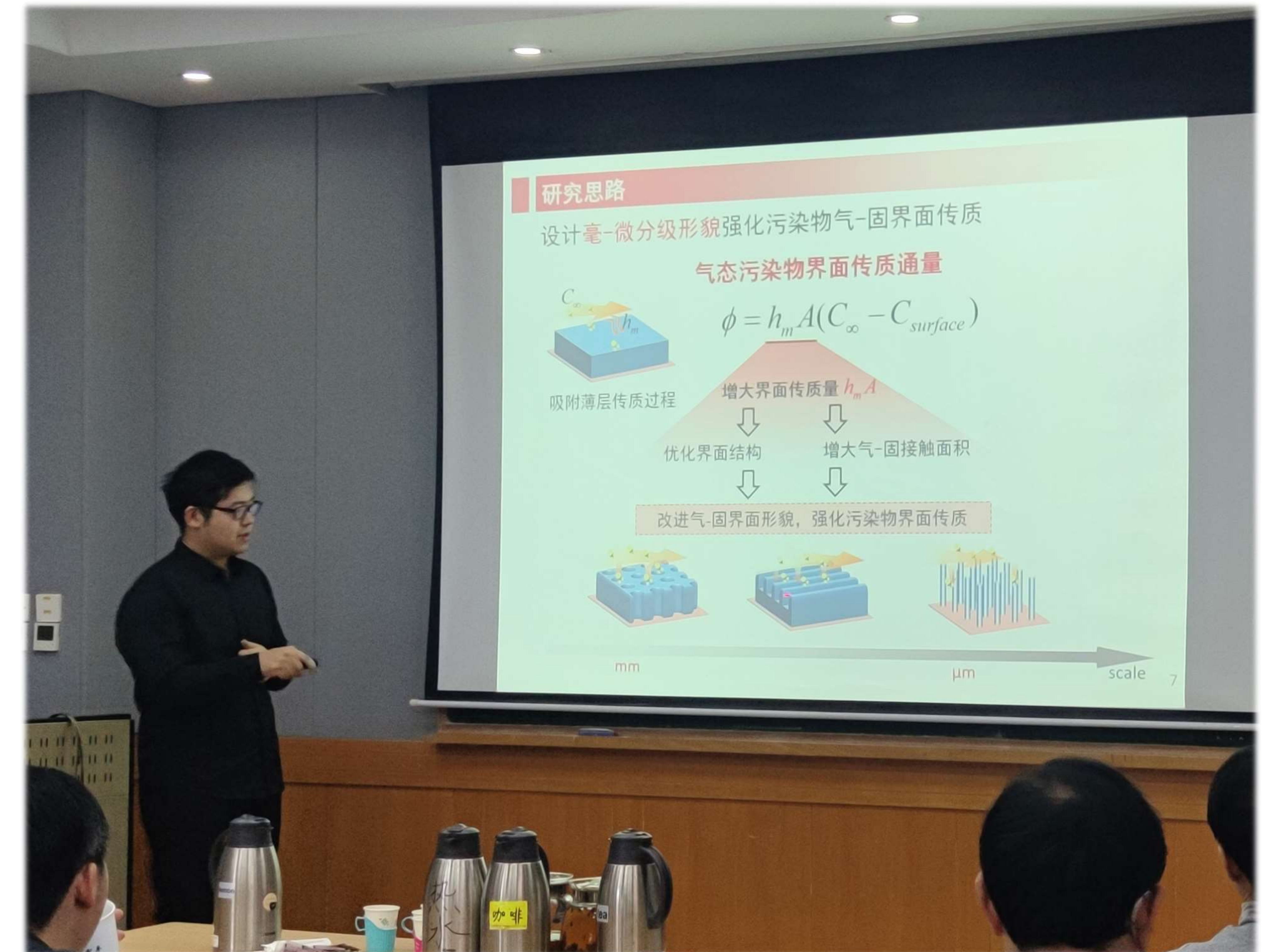
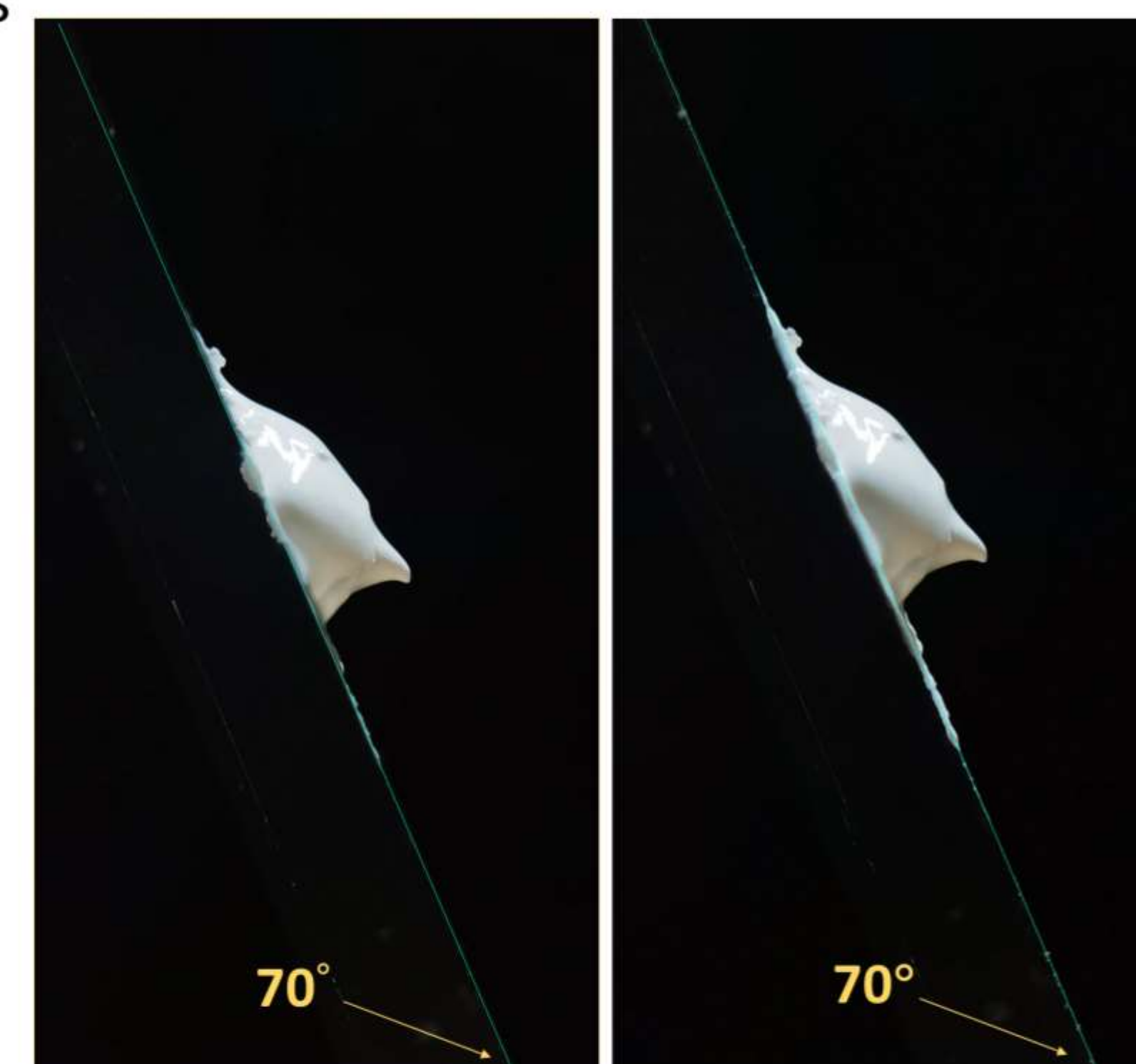
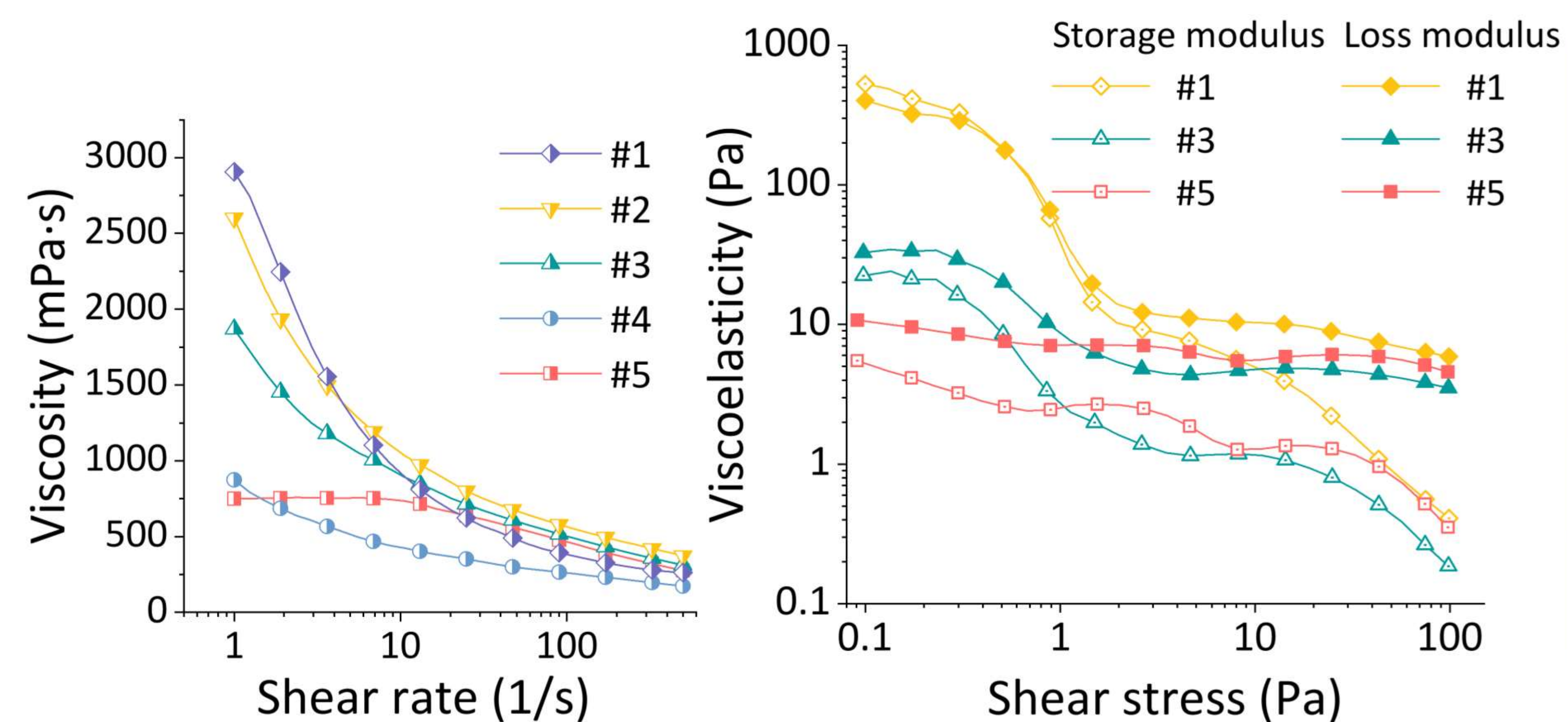
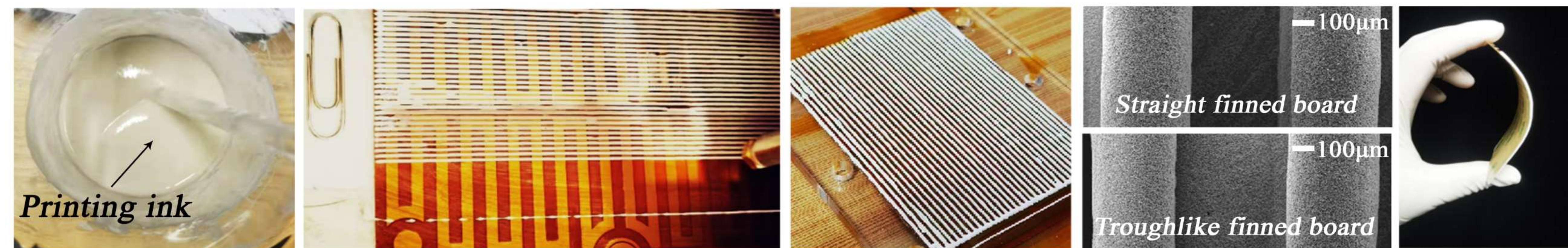
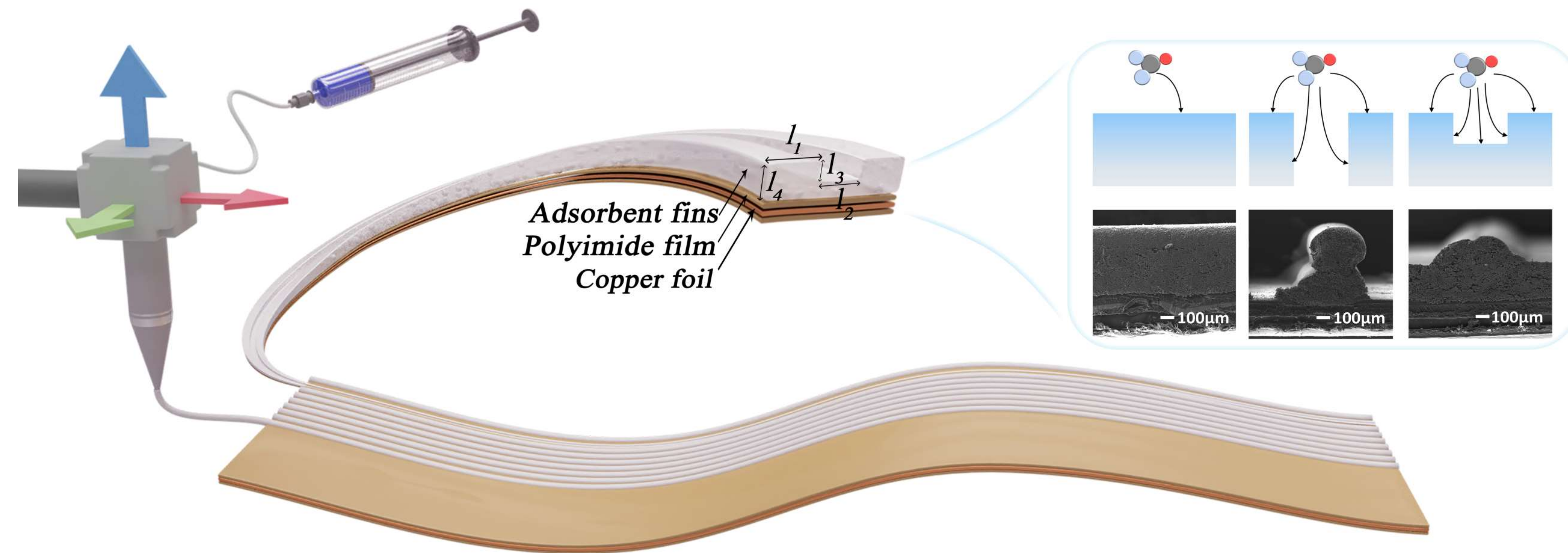


Capture efficiency for over 2 μm bioaerosols by the filters is over 90% at +7kV charging



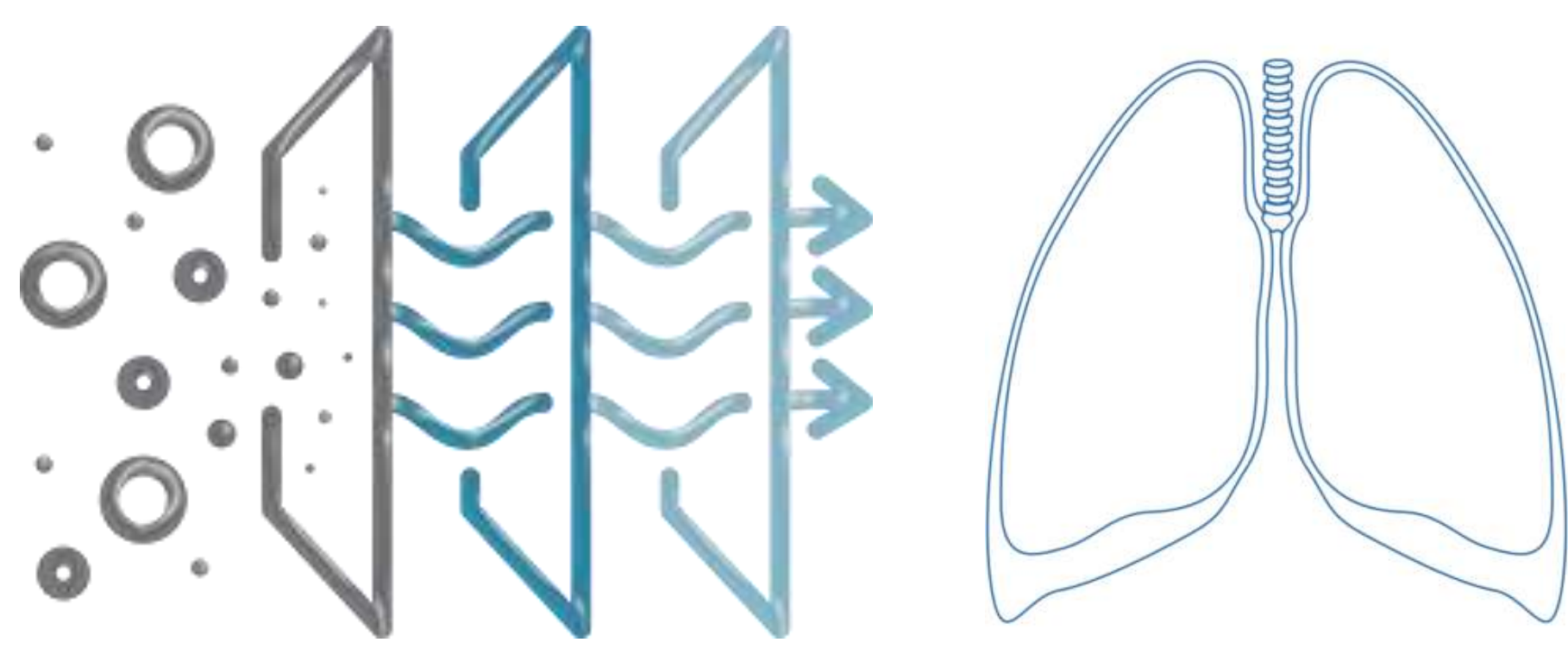
Researches Activities Funs

Direct Ink Writing Based 3D Printing with Sub-milli-interface Morphologies for indoor formaldehyde removal, by Qiwei CHEN



Qiwei is introducing his research during his doctoral qualification examination.

He got the First Prize Award of Student Forum at the 10th International Conference on Sustainable Development in the Building and Environment (SuDBE2021), Chongqing, China.

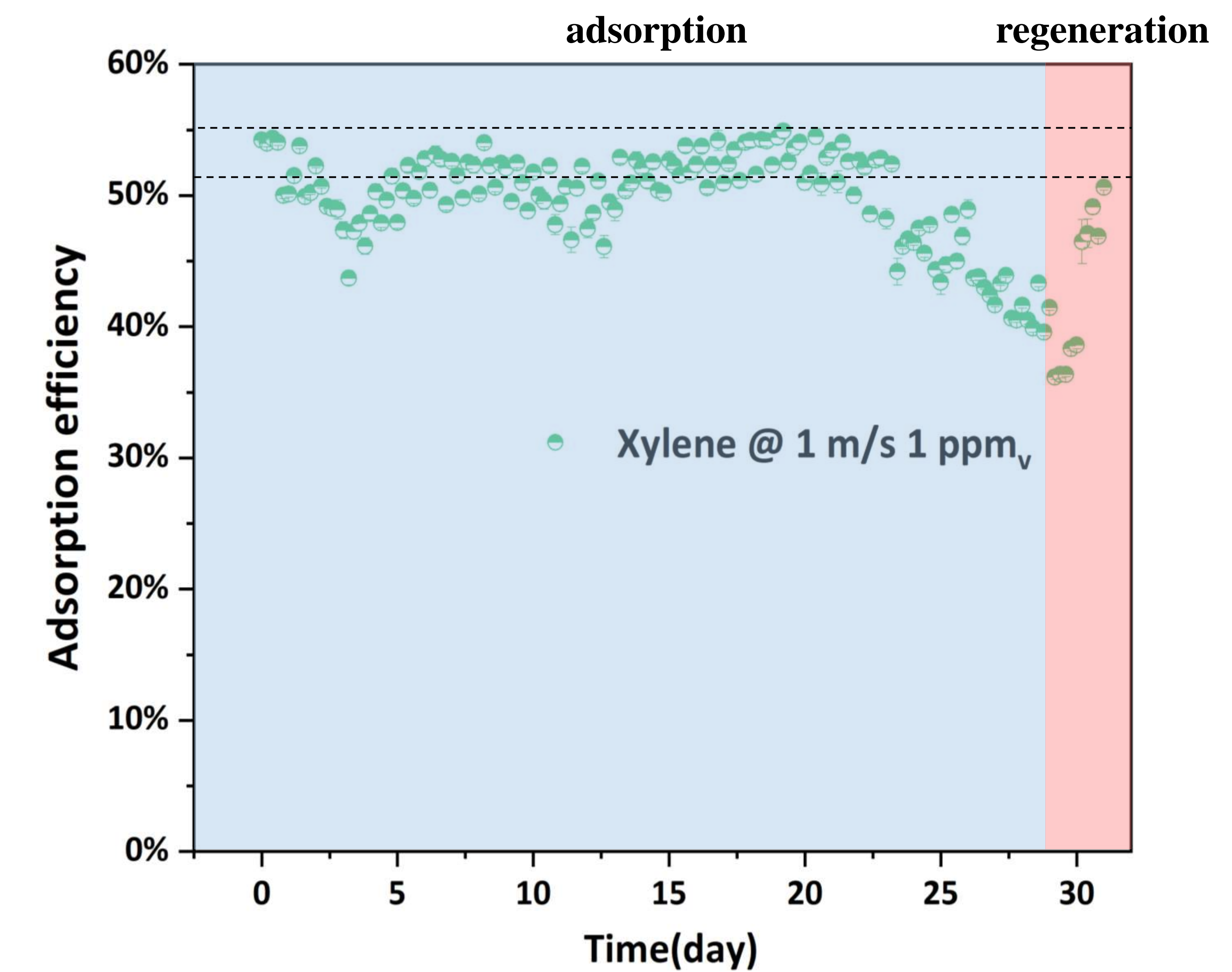
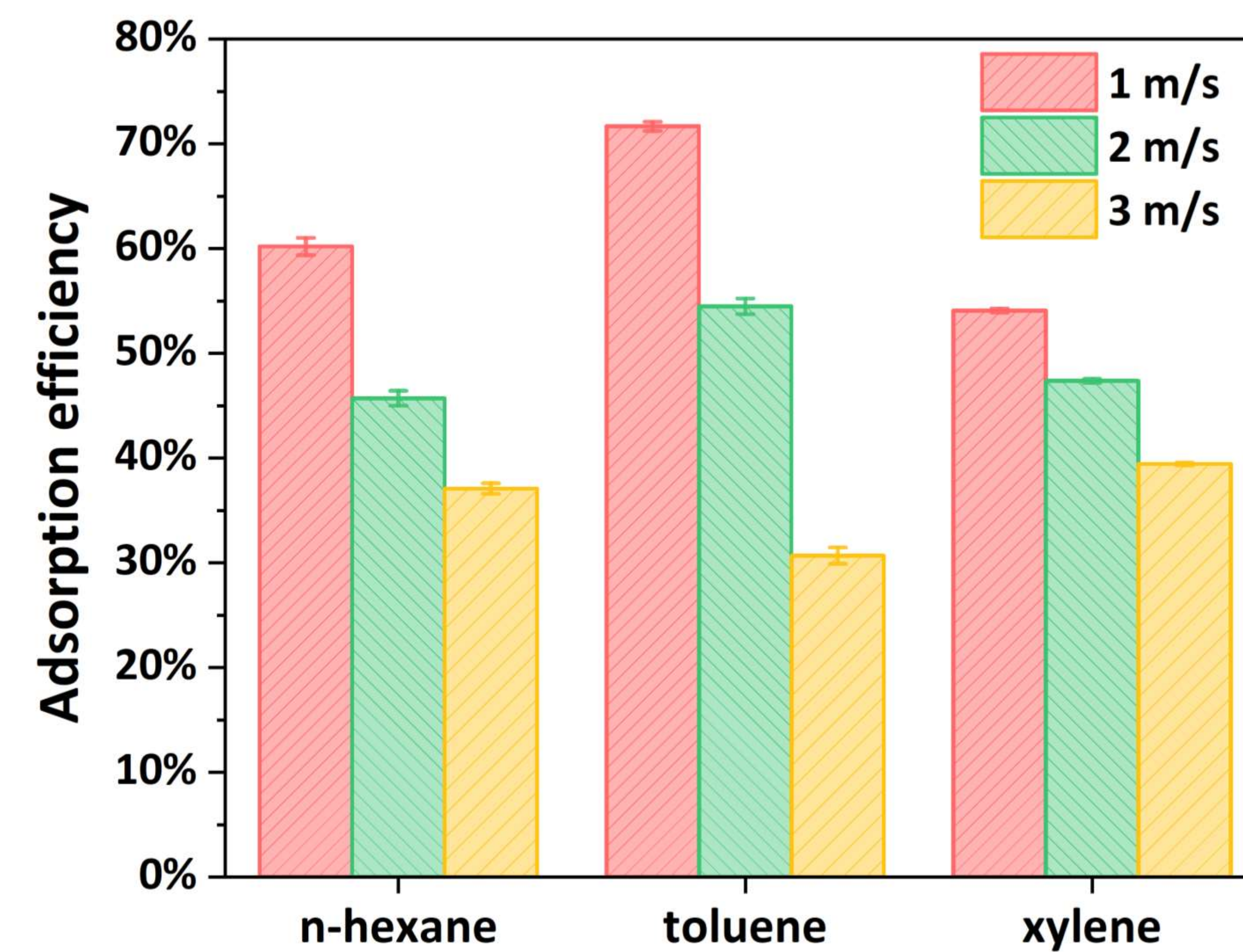
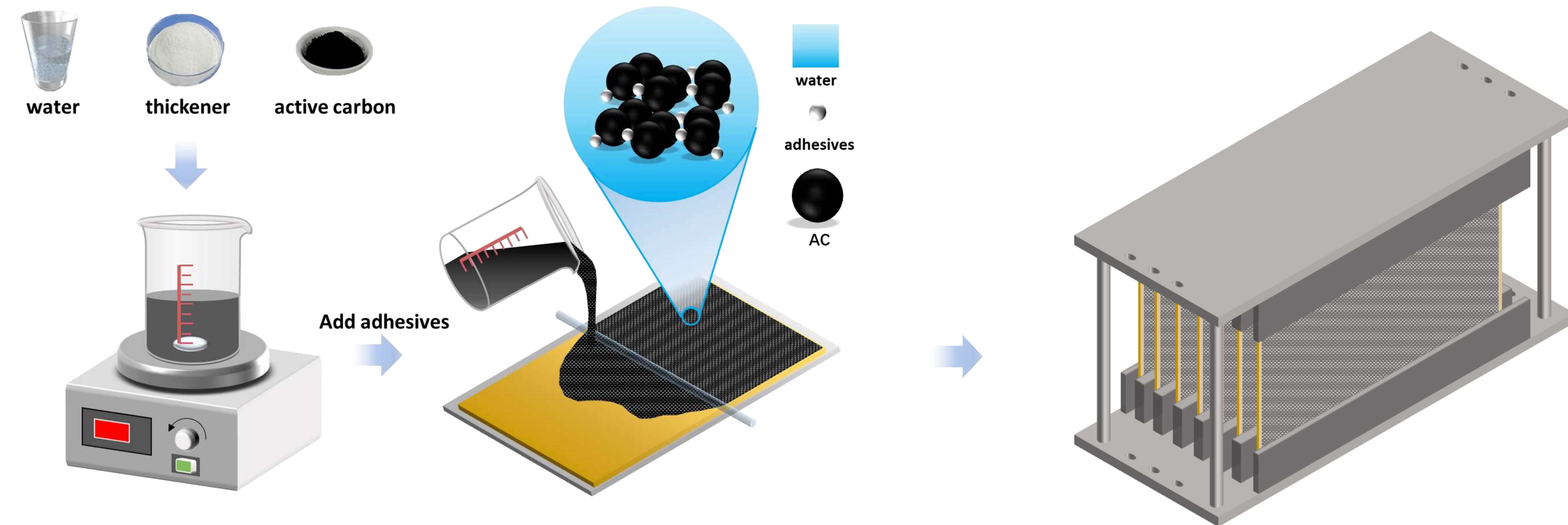


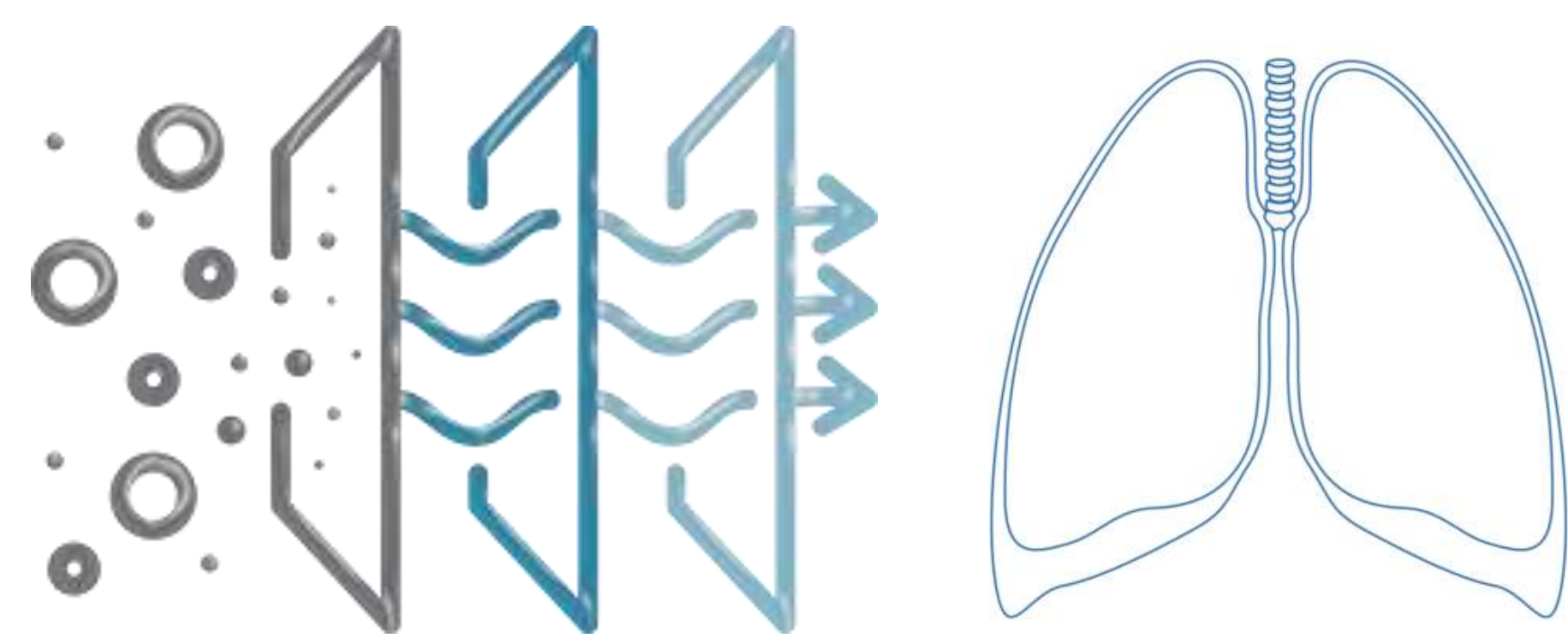
Researches Activities Funs

Design and Implementation of an In-situ Thermally Regenerated Adsorption Module for Removing Gas-phase Toluene, Xylene and n-Hexane, by Xiao LEI



Xiao LEI stands on the Great Wall, thinking his thinking.



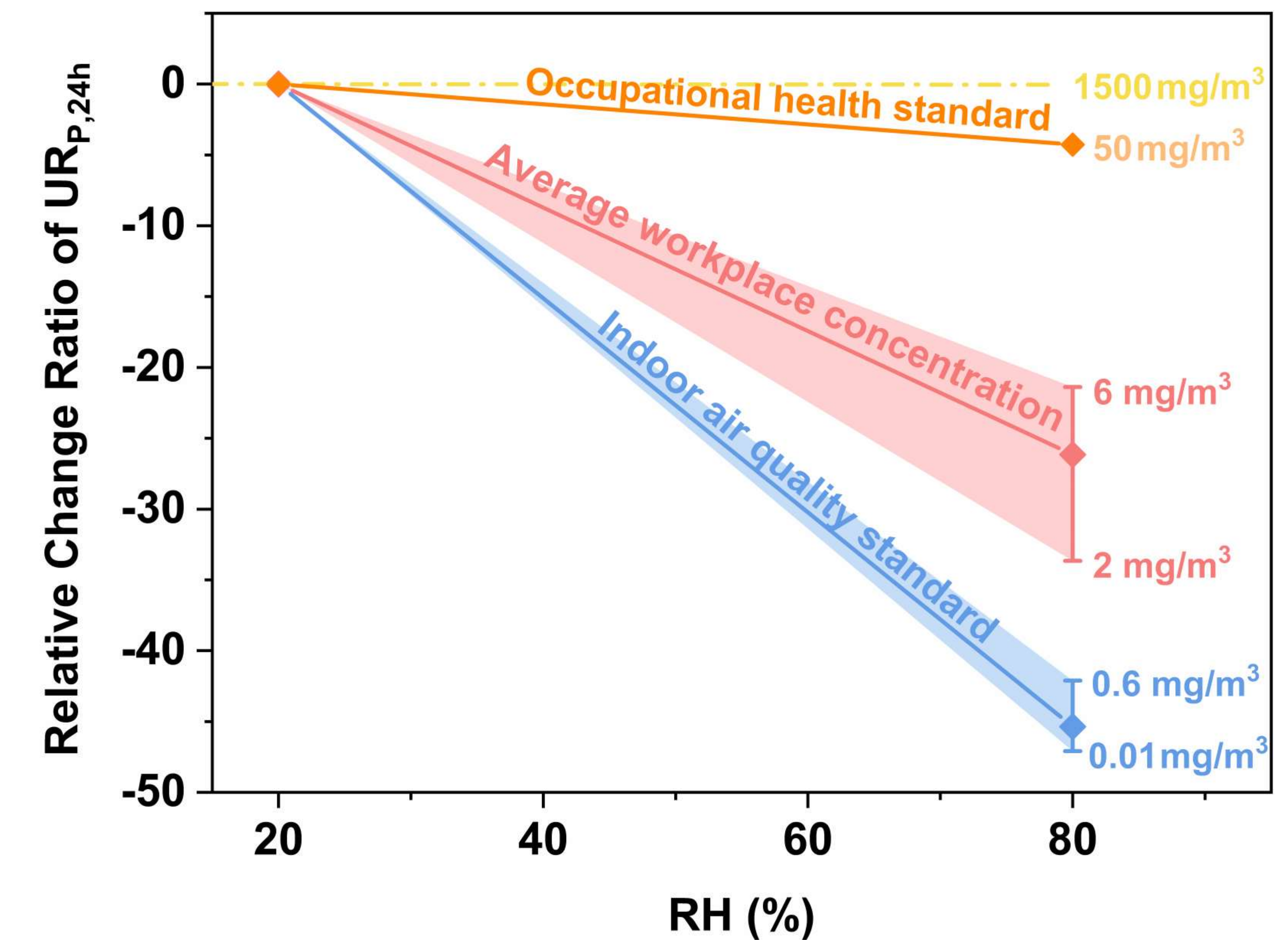
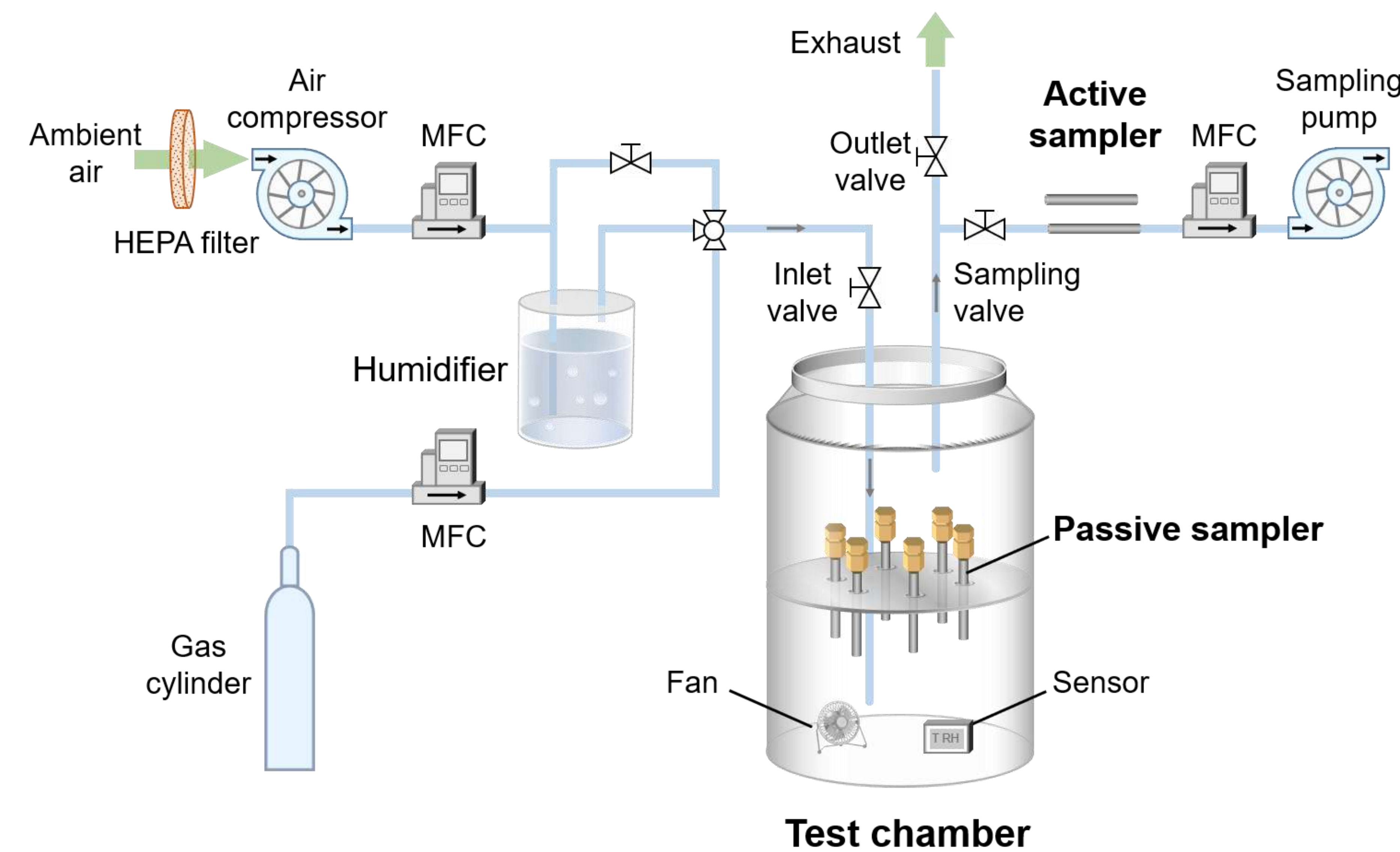


Researches Activities Funs



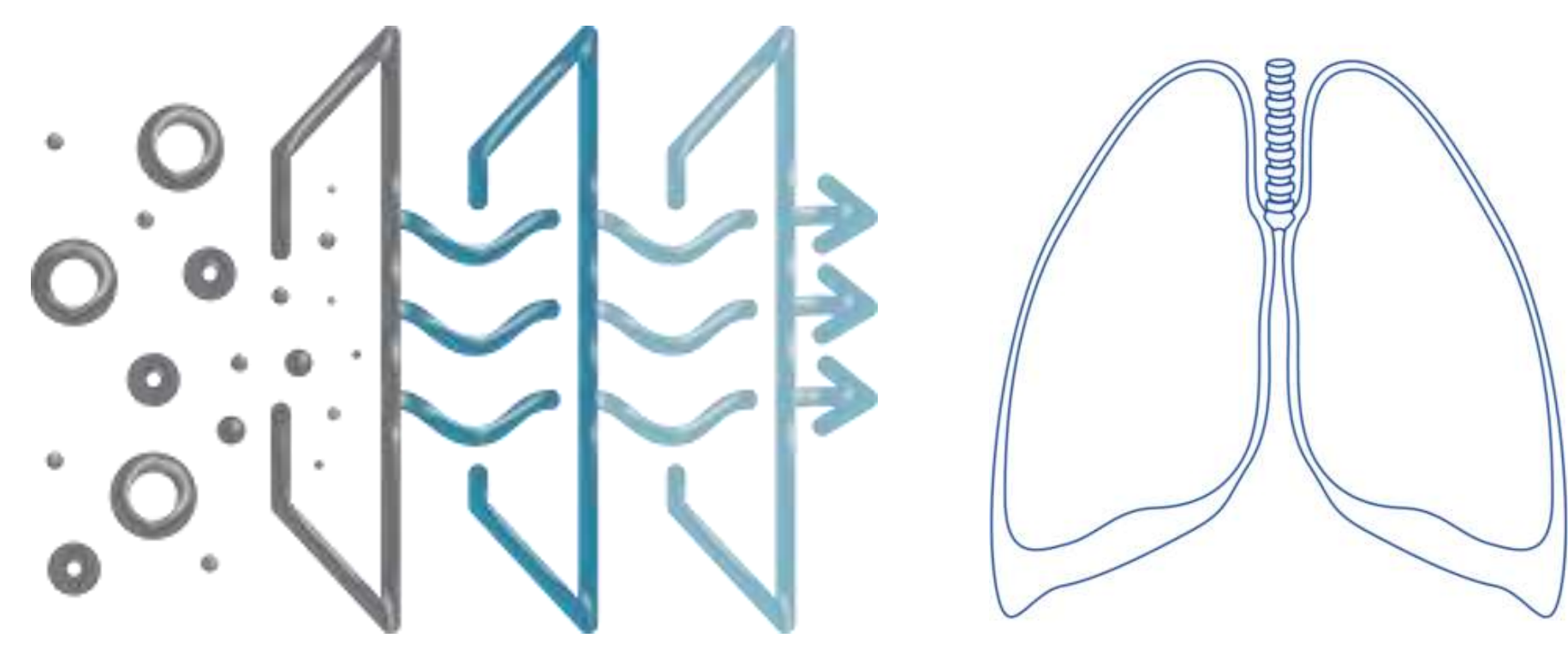
Yan and her first snow in Beijing

Study for toluene uptake rate at varying environmental conditions on Tenax TA diffusive samplers by Yan WANG



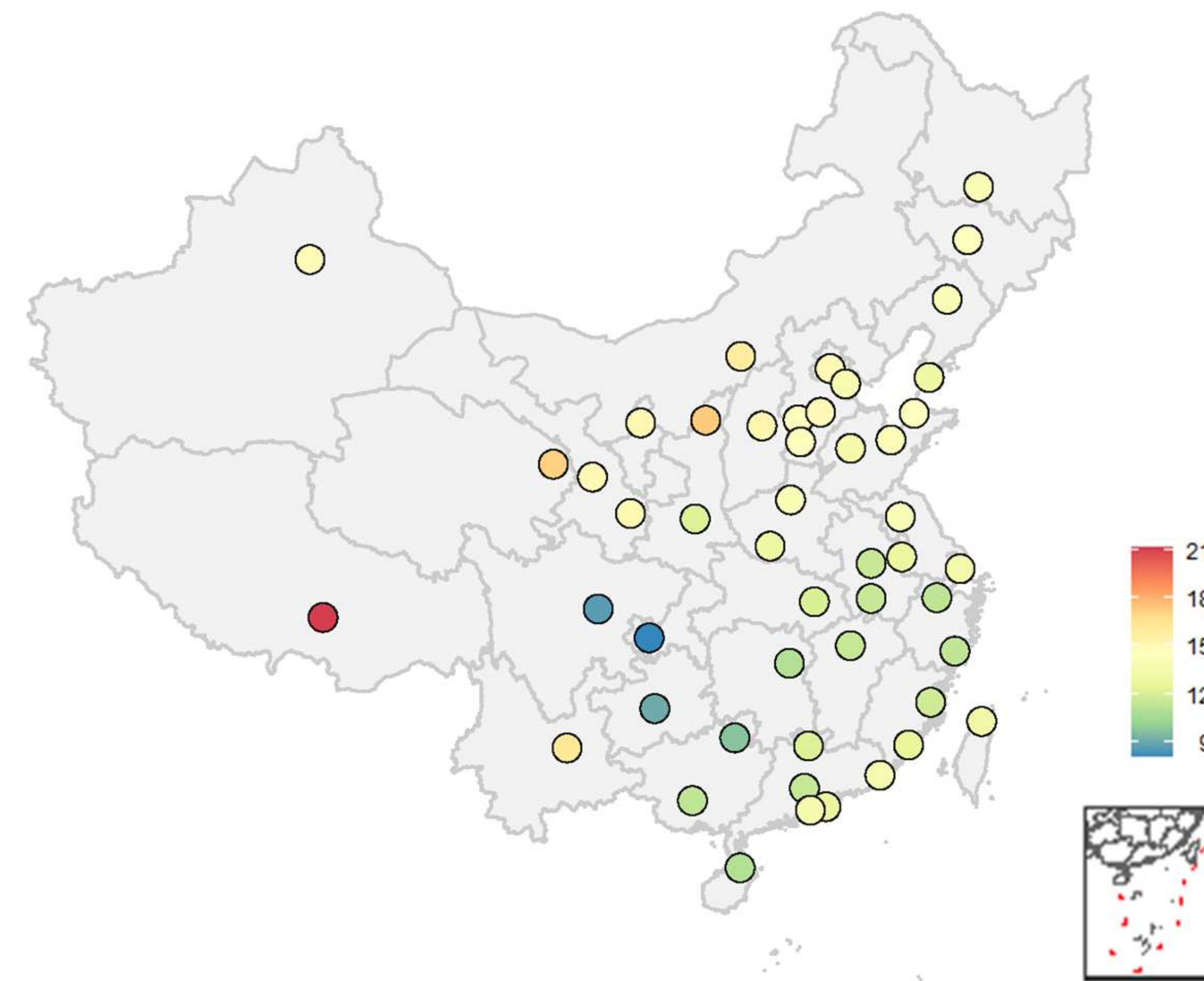
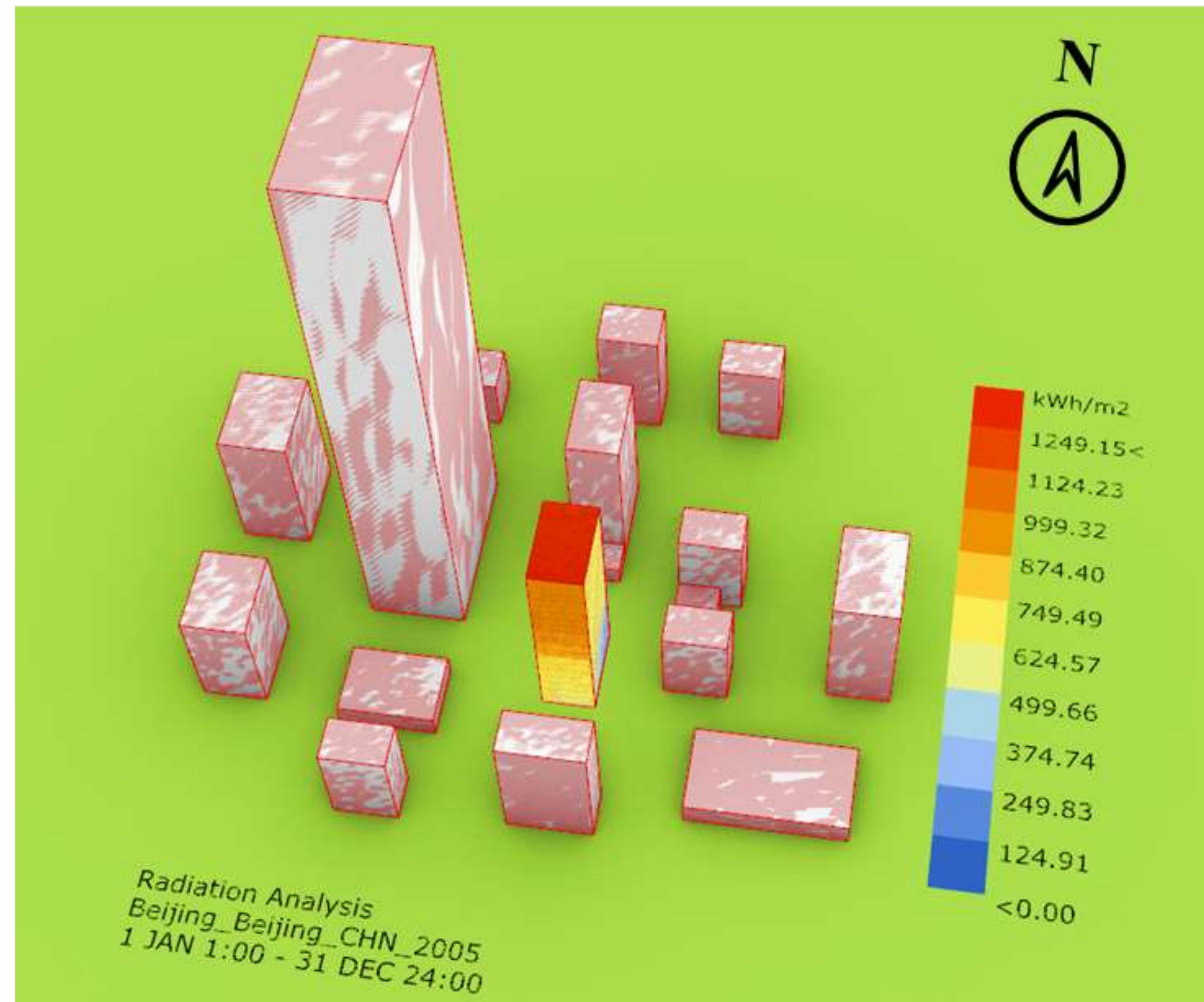
Relative change ratios of toluene uptake rates.

This study explored the influence of environmental factors such as temperature, humidity and concentration on toluene uptake rate in Tenax TA diffusive samplers.



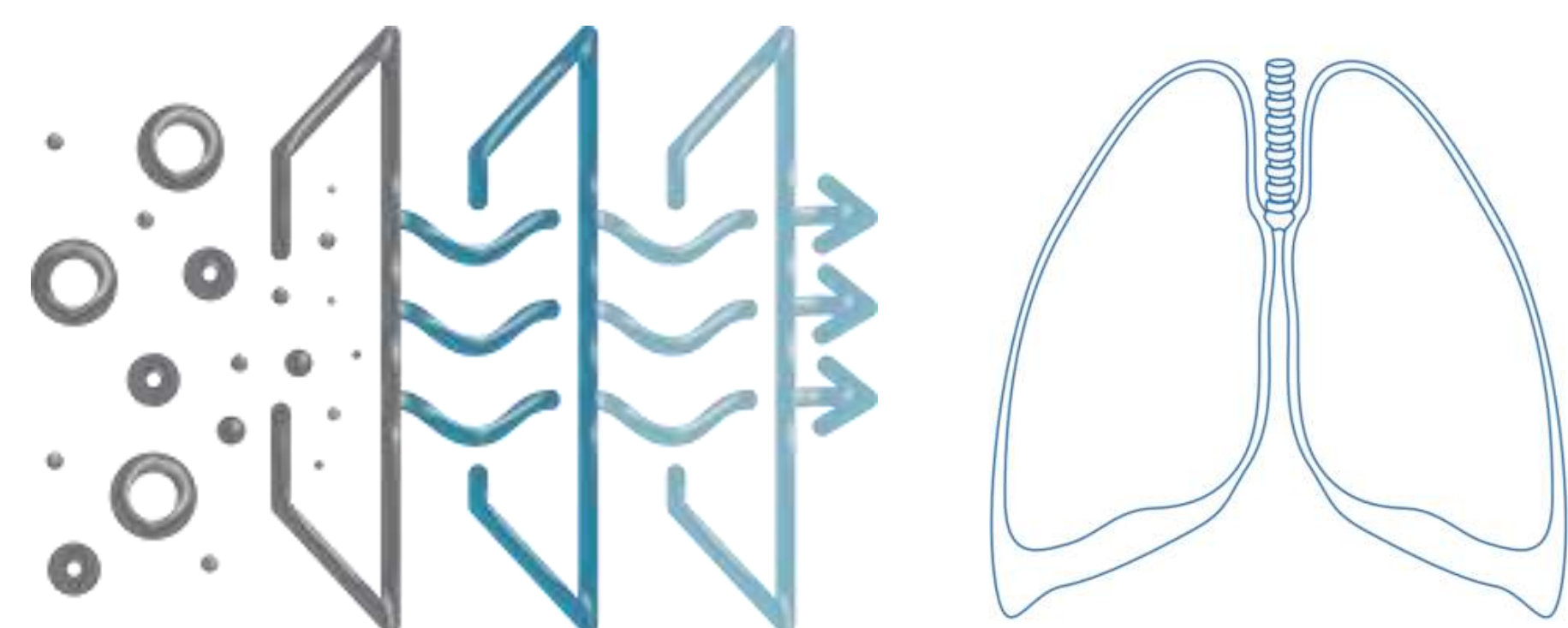
Researches Activities Funs

Study on the potential of radiation resources on building facades, by Wuwei ZOU

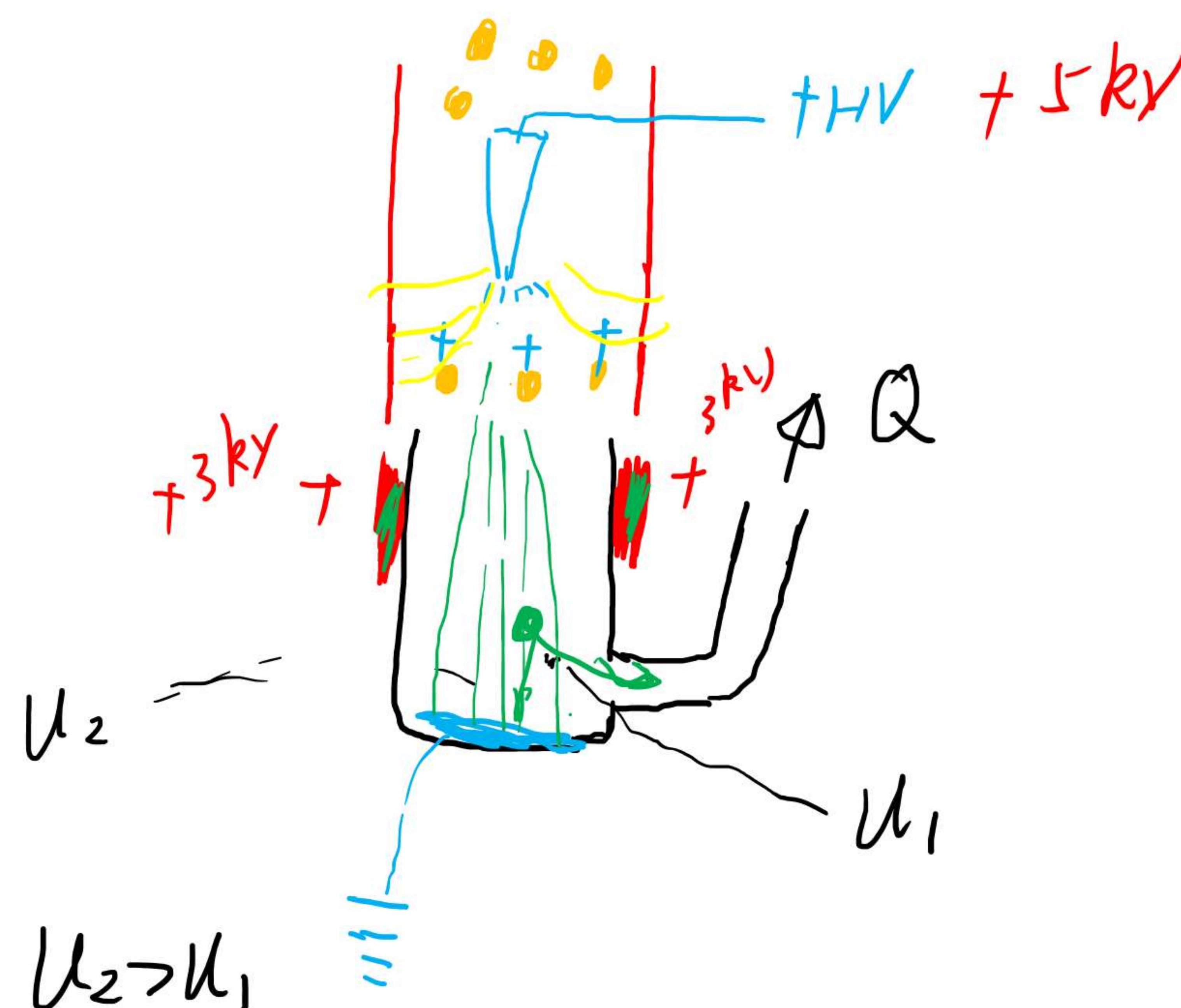


The simulation results of the solar radiation on building facades show that the radiation resources of the building facades have great potential for utilization.



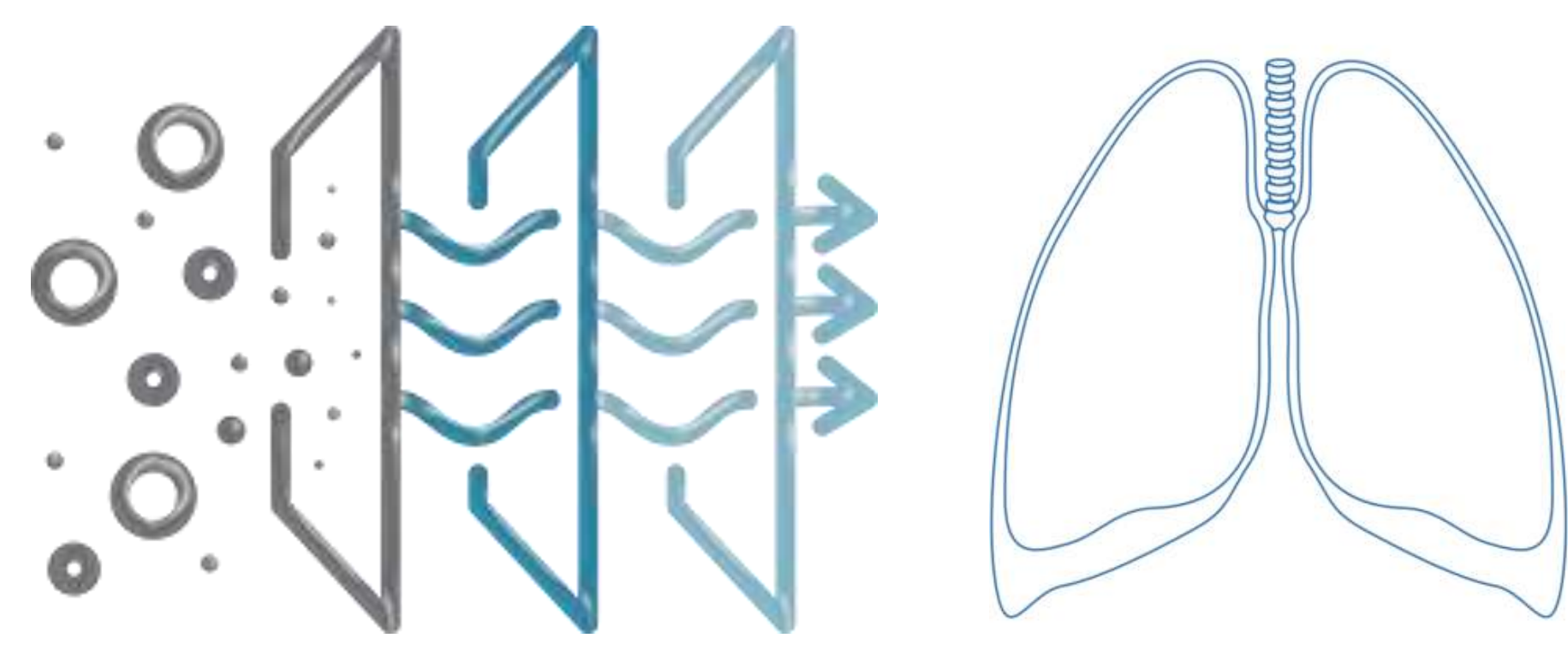


Researches Activities Funs



Xihui LIU from Southeast University will join our team for her Ph.D. study on Sept. 2022

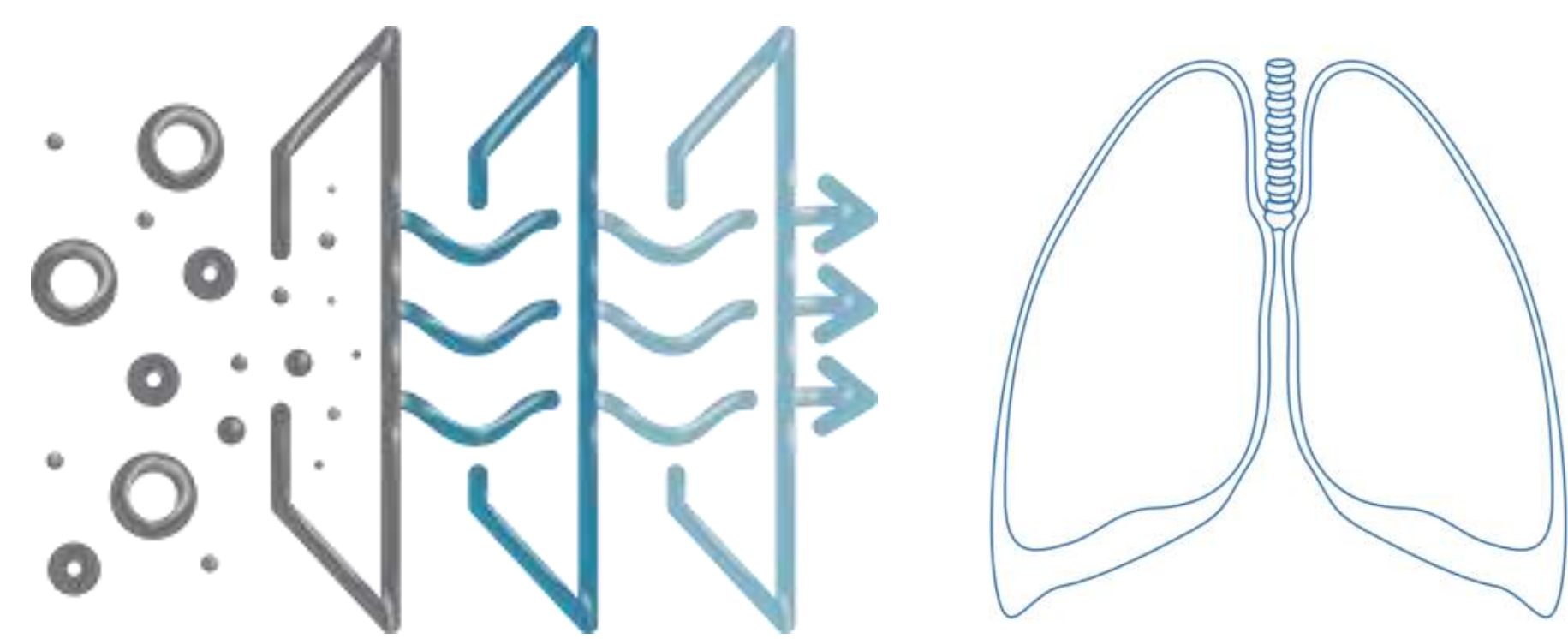
Xihui is now starting to develop a microfluidics-based technology for fast analyses of ionic components on airborne particles.



Researches Activities Funs

Some publications we achieved in 2021. (all papers are listed on <https://jmo-lab.net/publications>)

- Tian EZ, Yu QP, Gao YL, Wang H, Wang C, Zhang YP, Li BH, Zhu MF, Mo JH*, Xu GY*, Li J*, Ultralow resistance two-stage electrostatically assisted air filtration by polydopamine coated PET coarse filter, *Small*, 2021, 17, 33: 2102051. **Inside Back Cover Paer.**
- Chen Z, Wu QY, Xu Y, Mo JH*, Partitioning of airborne PAEs on indoor impermeable surfaces: a microscopic view of the sorption process, *Journal of Hazardous Materials*, 2022, 424, 127326.
- Gao YL, Tian EZ, Mo JH*, Electrically responsive coarse filters endowed by high-dielectric-constant surface coatings toward efficient removal of ultrafine particles and ozone, *ACS ES&T Engineering*, 2021, 1 (10): 1449–1459.
- Xia FX, Gao YL, Tian EZ, Afshari A, Mo JH*, Fast fabricating cross-linked nanofibers into flameproof metal foam by air-drawn electrospinning for electrostatically assisted particle removal, *Separation and Purification Technology*, 2021, 274: 119076.
- Chen QW, Liu F, Mo JH*, Vertical macro-channel modification of a flexible adsorption board with in-situ thermal regeneration for indoor gas purification to increase effective adsorption capacity, *Environmental Research*, 2021, 192: 110218.
- Chen QW, Xiao R, Lei X, Yu T, Mo JH*, Experimental and modeling investigations on the adsorption behaviors of indoor volatile organic compounds in an in-situ thermally regenerated adsorption-board module, *Building and Environment*, 2021, 203: 108065.
- Gong QP, Kou FC, Sun XY, Zou Y, Mo JH, Wang X*, Towards zero energy buildings: A novel passive solar house integrated with flat gravity-assisted heat pipes. *Applied Energy*, 2022, 306: 117981.
- Orlando R, Gao YL, Fojan P, Mo JH, Afshari A*, Filtration performance of ultrathin electrospun cellulose acetate filters doped with TiO₂ and activated charcoal, *Buildings*, 2021, 11(11): 557.
- Plana D#, Tian EZ#(co-first), Cramer AK#, Yang H#, Carmack MM, Sinha MS., Bourgeois FT, Yu SH, Masse P, Boyer J, Kim M, Mo JH, LeBoeuf NR*, Li J*, Sorger PK*, Assessing the filtration efficiency and regulatory status of N95s and nontraditional filtering face-piece respirators available during the COVID-19 pandemic, *BMC Infectious Diseases*, 2021, 21, 712.
- He LC, Lin Y, Day D, Teng YB, Wang XT, Liu XL, Yan E, Gong JC, Qin J, Wang XL, Xiang JB, Mo JH, Zhang YP, Zhang JF*, Nitrated Polycyclic Aromatic Hydrocarbons and Arachidonic Acid Metabolisms Relevant to Cardiovascular Pathophysiology: Findings from a Panel Study in Healthy Adults, *Environmental Science & Technology*, 2021, 55, 6, 3867–3875.
- Xiang JB, Seto E, Mo JH, Zhang JF, Zhang YP*, 2021. Impacts of implementing Healthy Building guidelines for daily PM_{2.5} limit on premature deaths and economic losses in urban China: A population-based modeling study. *Environment International*, 2021, 147, 106342. Published date: 2021-2-1.
- Sadrizadeh S*, Aganovic A, Bogdan A, Wang C, Afshari A, Hartmann A, Croitoru C, Khan A, Kriegel M, Lind M, Liu Z, Melikov A, Mo JH, Rotheudt H, Yao R, Zhang Y, Abouali O, Langvatn H, Sköldenberg O, Cao G, A systematic review of operating room ventilation. *Journal of Building Engineering*, 2021, 40, 102693.
- ...



Researches Activities Funs



Enze finished her PhD dissertation defense. Congratulations to Dr.Tian!

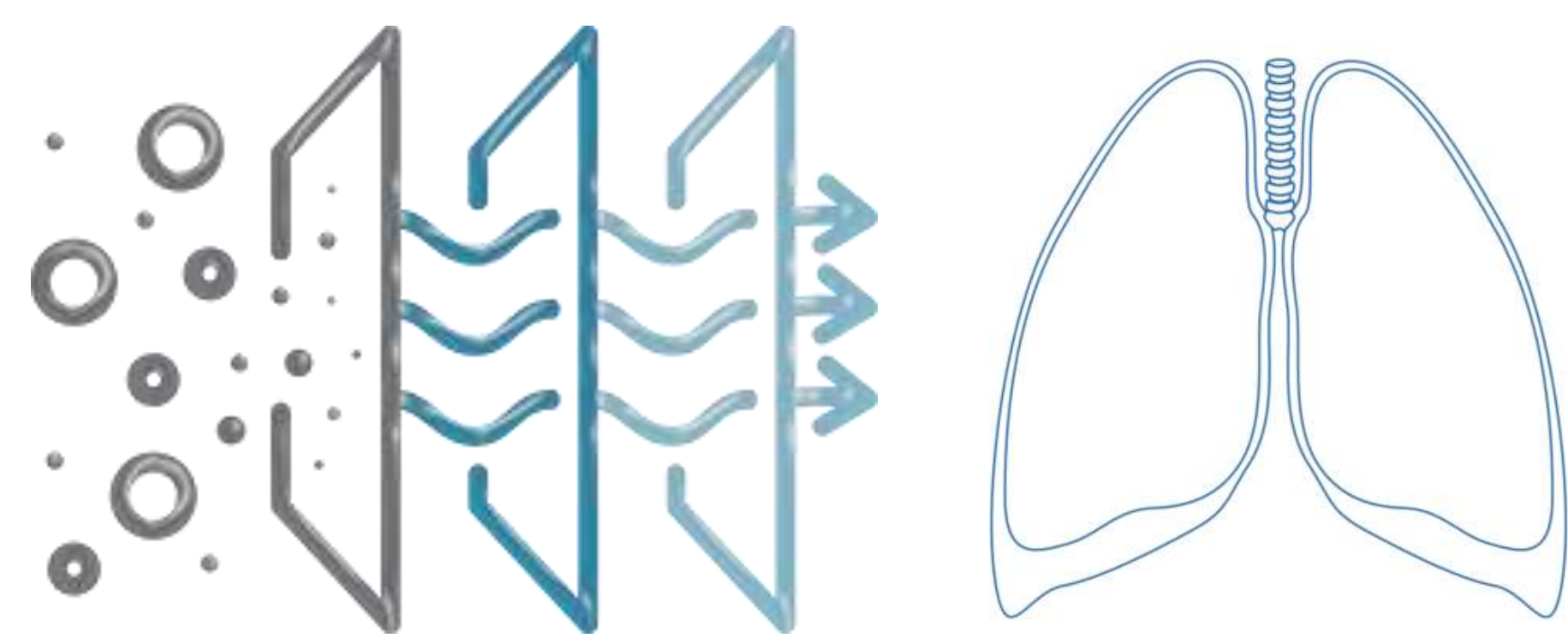


Graduation ceremony for Enze and Wuwei

From left to right, 1st row: Yan WANG, Wuwei ZOU, Jinhan MO, Enze TIAN, Xiao LEI;
2nd row: Yilun GAO, Xiaolin LI, Zhuo CHEN, Fanxuan XIA, Qiwei CHEN, Yuting GU



Yilun attended his belated commencement ceremony because of COVID-19 pandemic and received his bachelor degree.



Researches Activities Funs

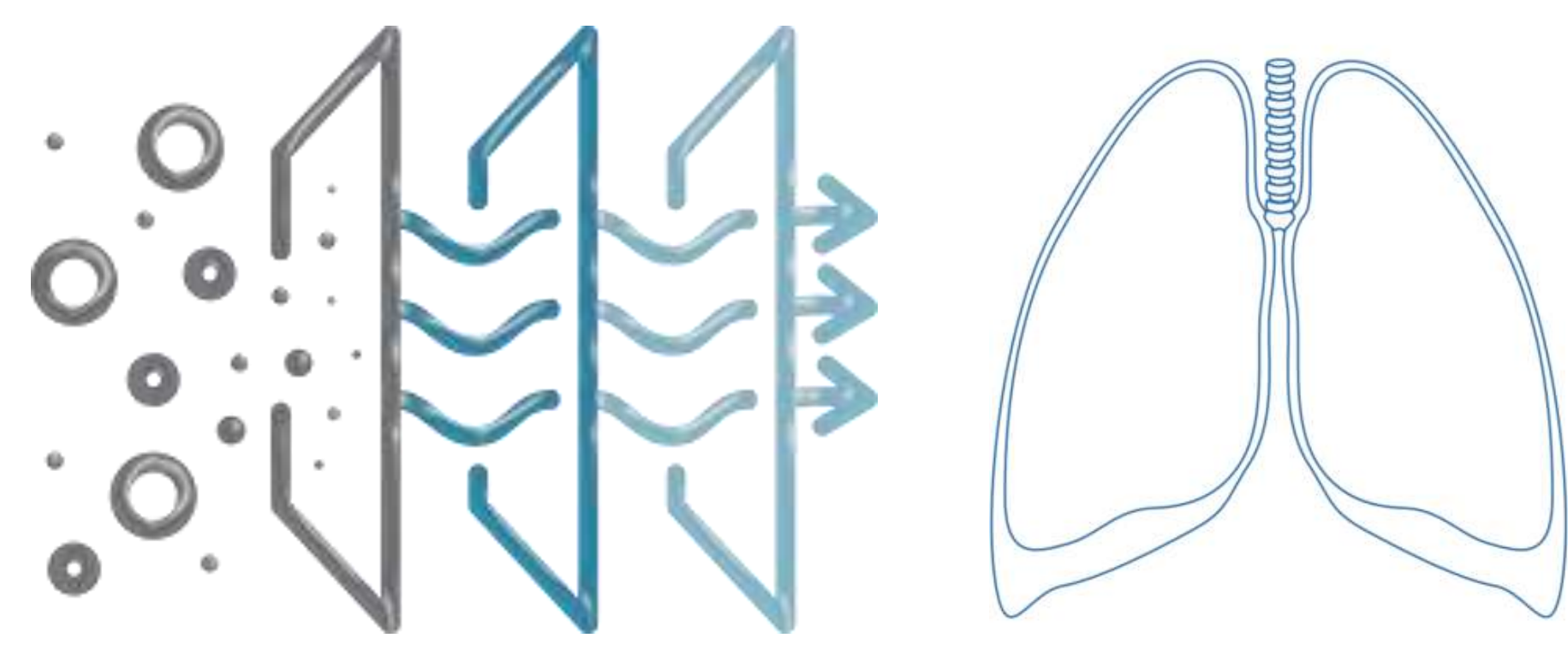


Freshman Students of Built Environment at THU

“We care about the climate in buildings”

Jinhan is responsible for undergraduate teaching affairs.





Researches Activities Funs



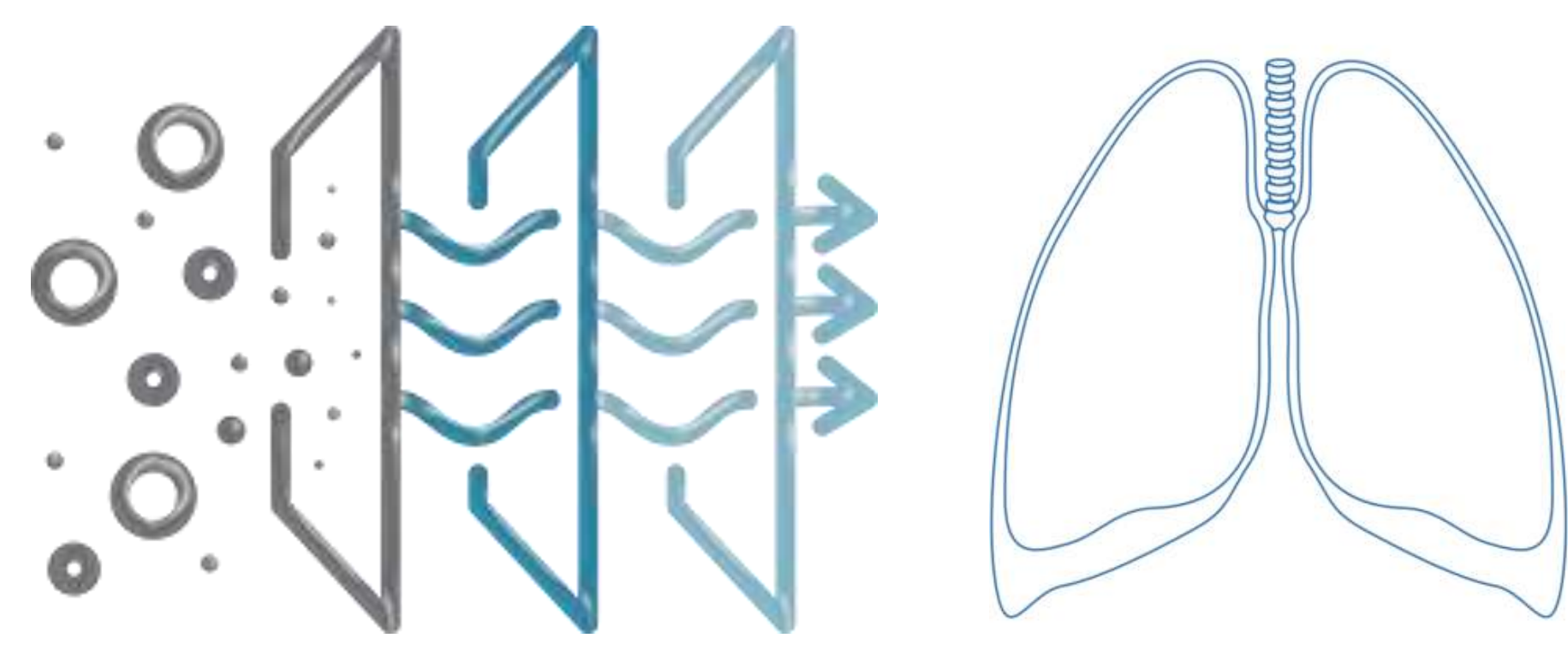
Jinhan Mo and Zhuo Chen

joining the Architecture Discipline Strategic Seminar
of National Natural Science Foundation of China,
Chongli District, Zhangjiakou City, Hebei Province.
They visited the National Ski Jumping Center (雪如意)
for Winter Olympics Beijing 2022.

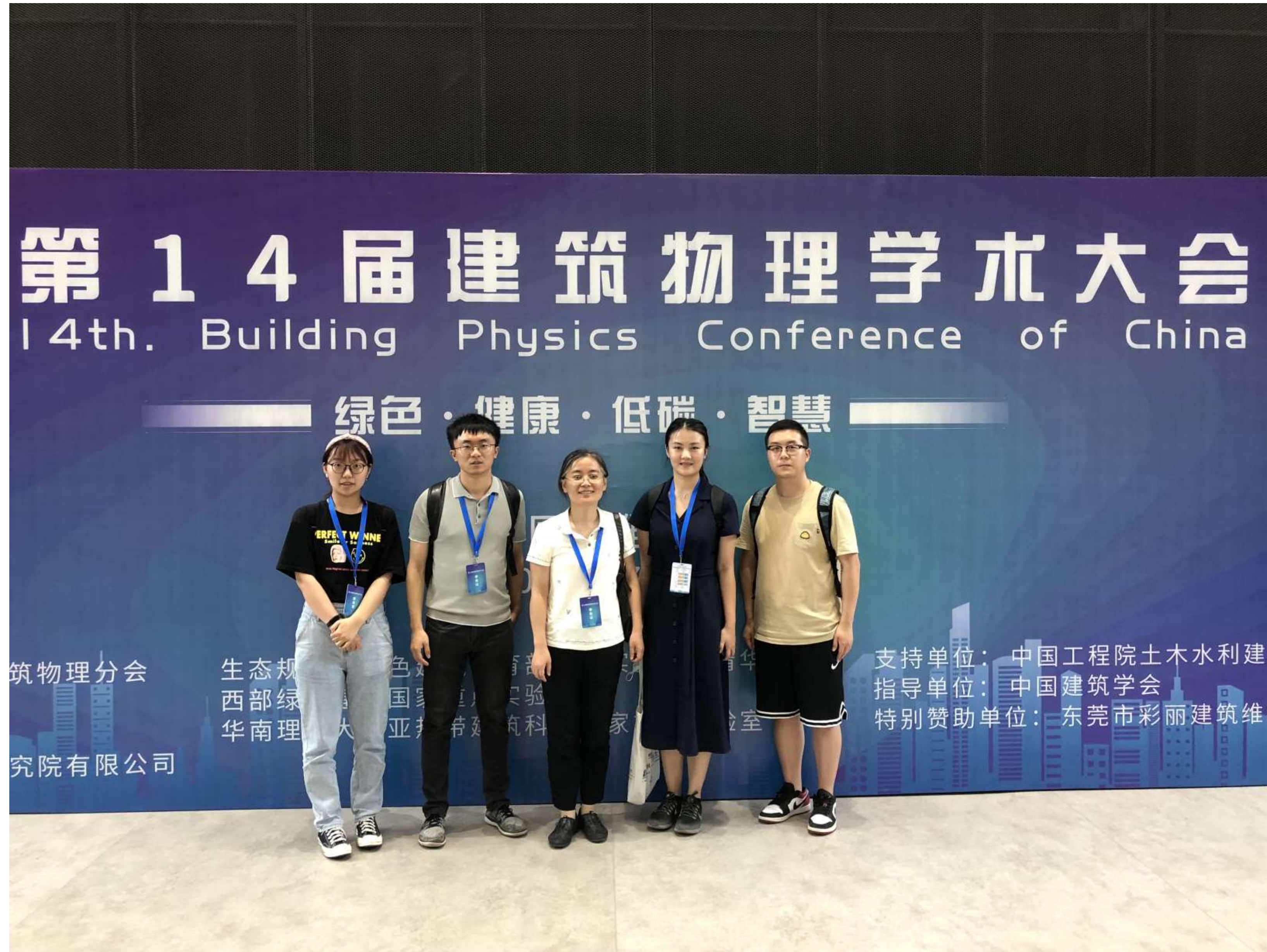


Prof. Bin Lu, Yinping Zhang and Dr. Jinhan Mo

taking a photo before the oral defense for the
Beijing Science and Technology Award



Researches Activities Funs



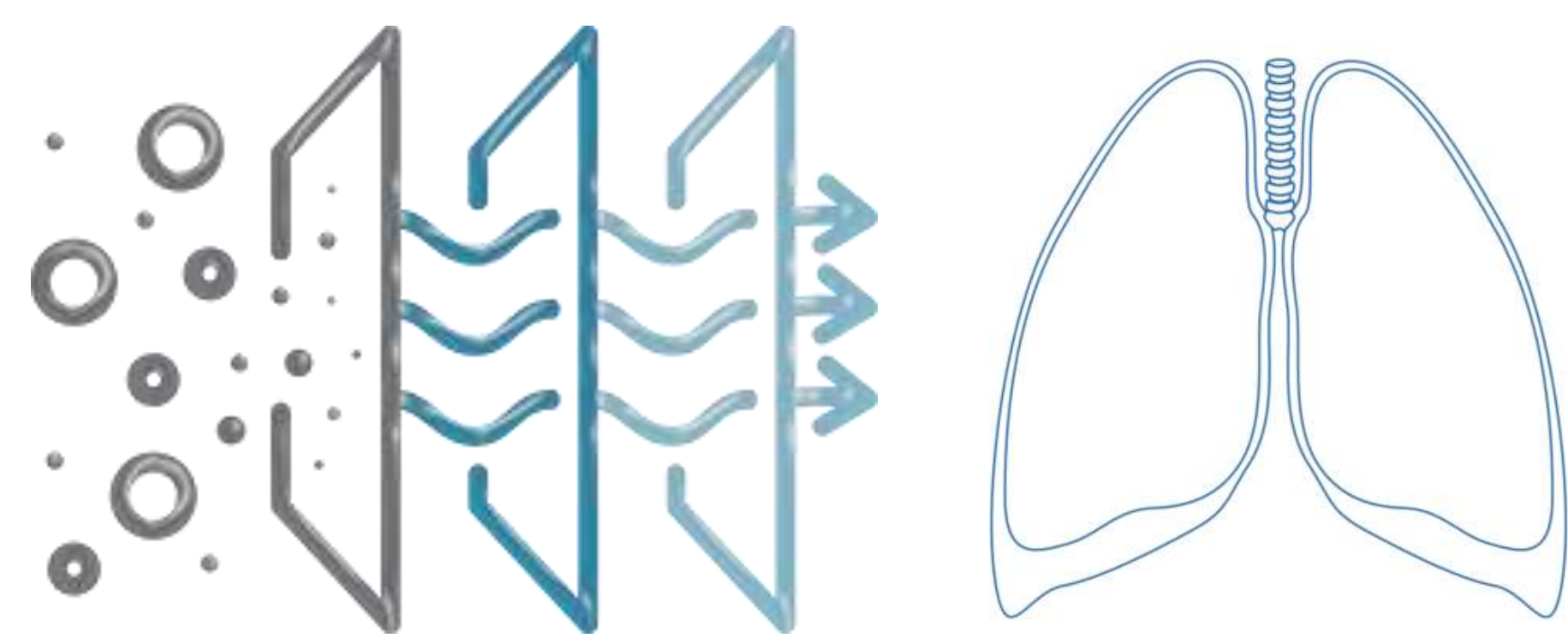
Enze and Wuwei attended the 14th Building Physics Conference of China, Xiongan, China, July 8-10.



Enze, Qiwei and Wuwei attended the 2nd International Conference for Global Chinese Academia on Energy and Built Environment (CEBE 2021), Chengdu, China, July 16-19.



Enze is sharing her ideas on electrostatically assisted air filtration on CEBE 2021 Conference.



Researches Activities Funs



Fanxuan introduces his research on the Bioaerosol Seminar in Huhhot, China, September, 17-18, 2021



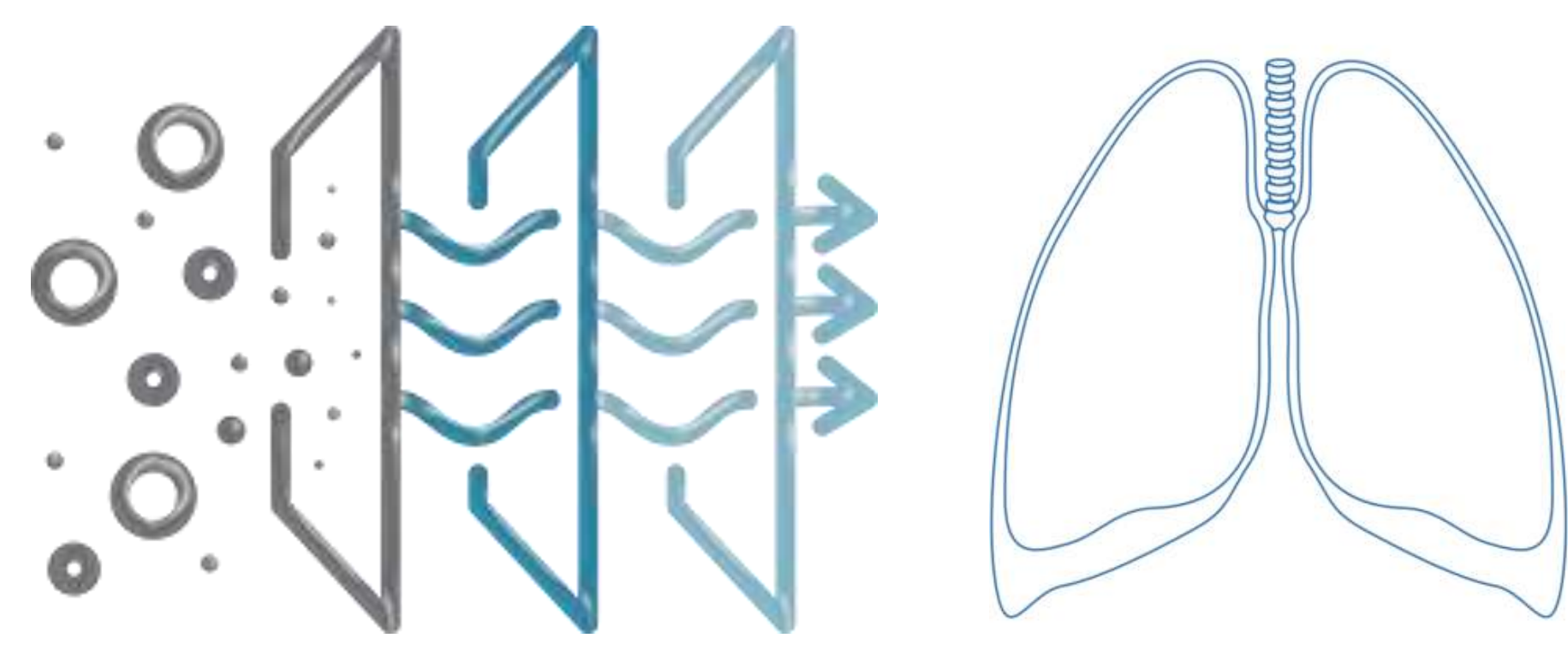
Enze and Yilun visited Donghua University to learn the advanced manufacturing methods for fibrous and polymer materials, October 17, 2021



Enze is sharing her study on the 10th International Conference on Advanced Fibers and Polymer Materials (ICAFPM 2021), Shanghai, China, October 17-20, 2021



Jinhan is discussing a demo device with Yuting, Fanxuan, Zhuo and Wuwei.

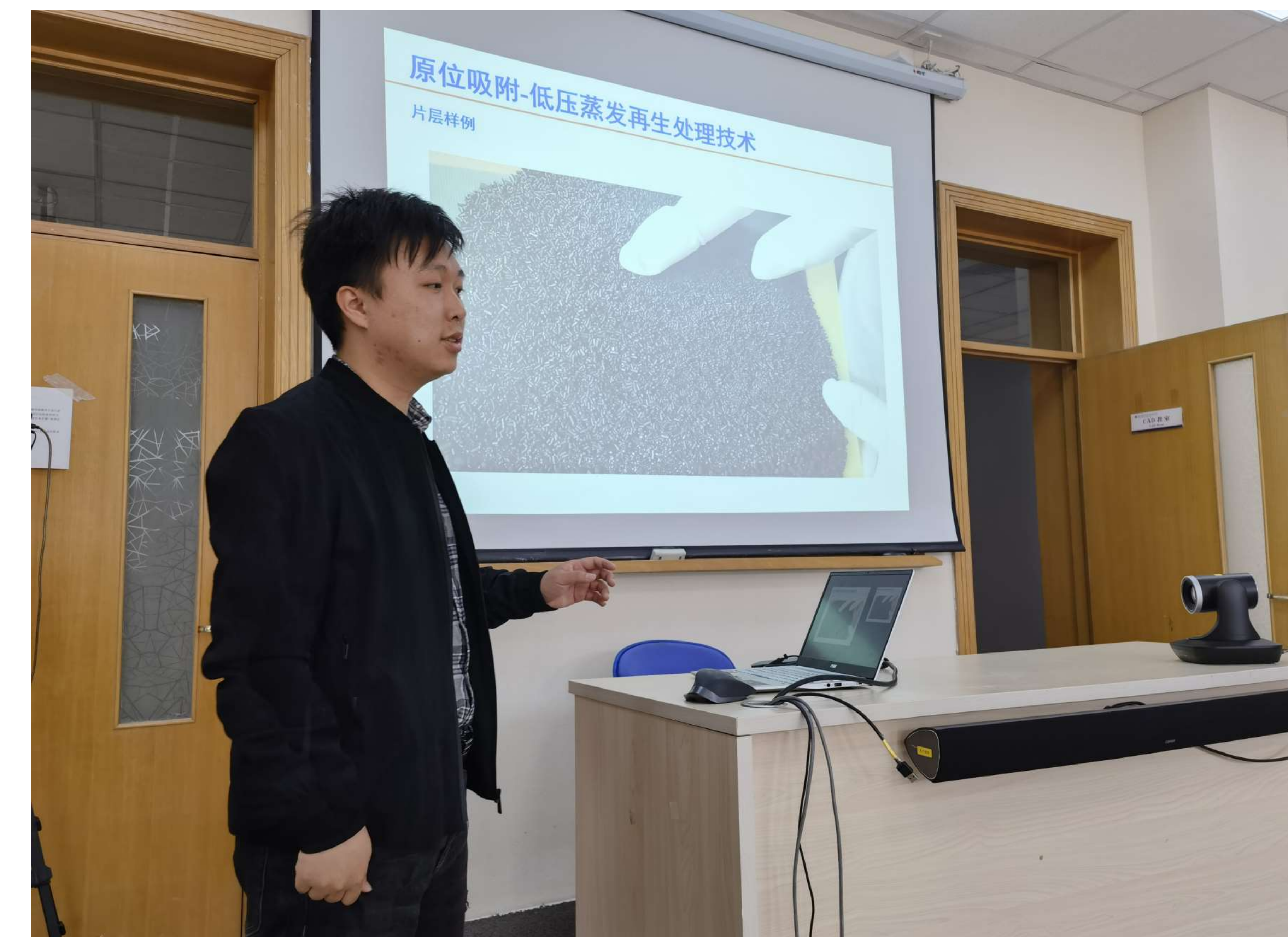


Researches Activities Funs

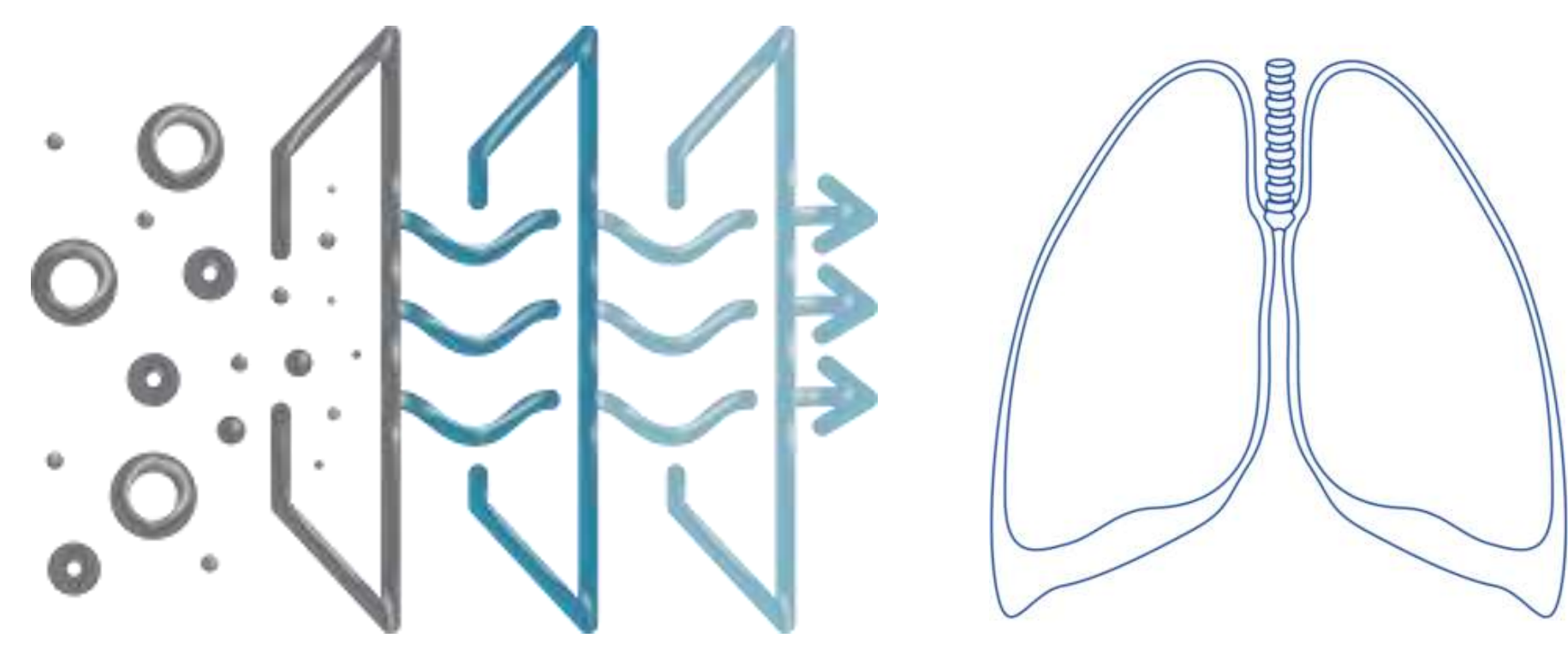
Jinhan MO, Qiwei CHEN and Xiao LEI work on a project to develop efficient and low-cost technologies for VOC reduction in furniture industries.



Group photo after a project meeting on May, 2021 and a rainbow!

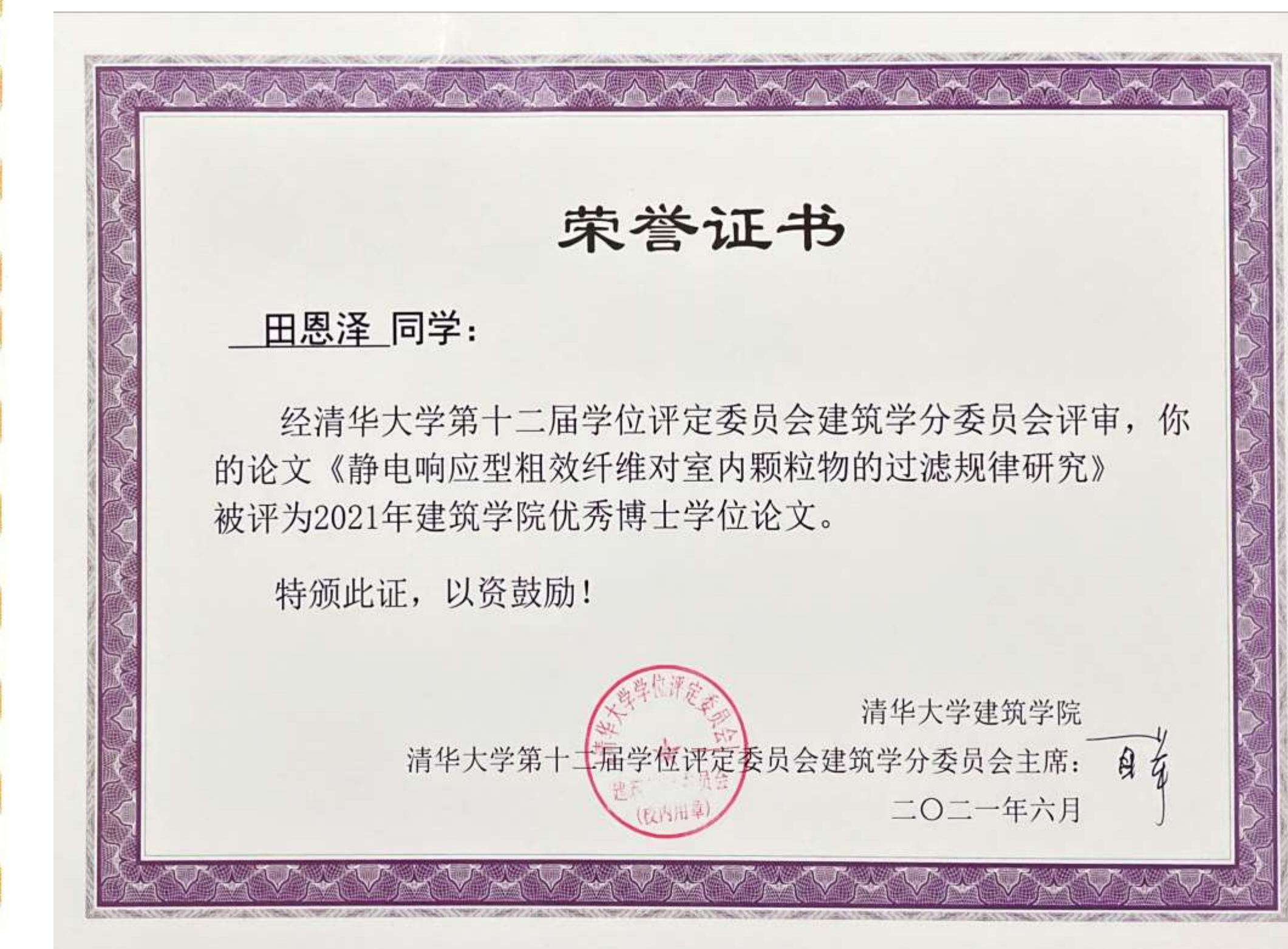


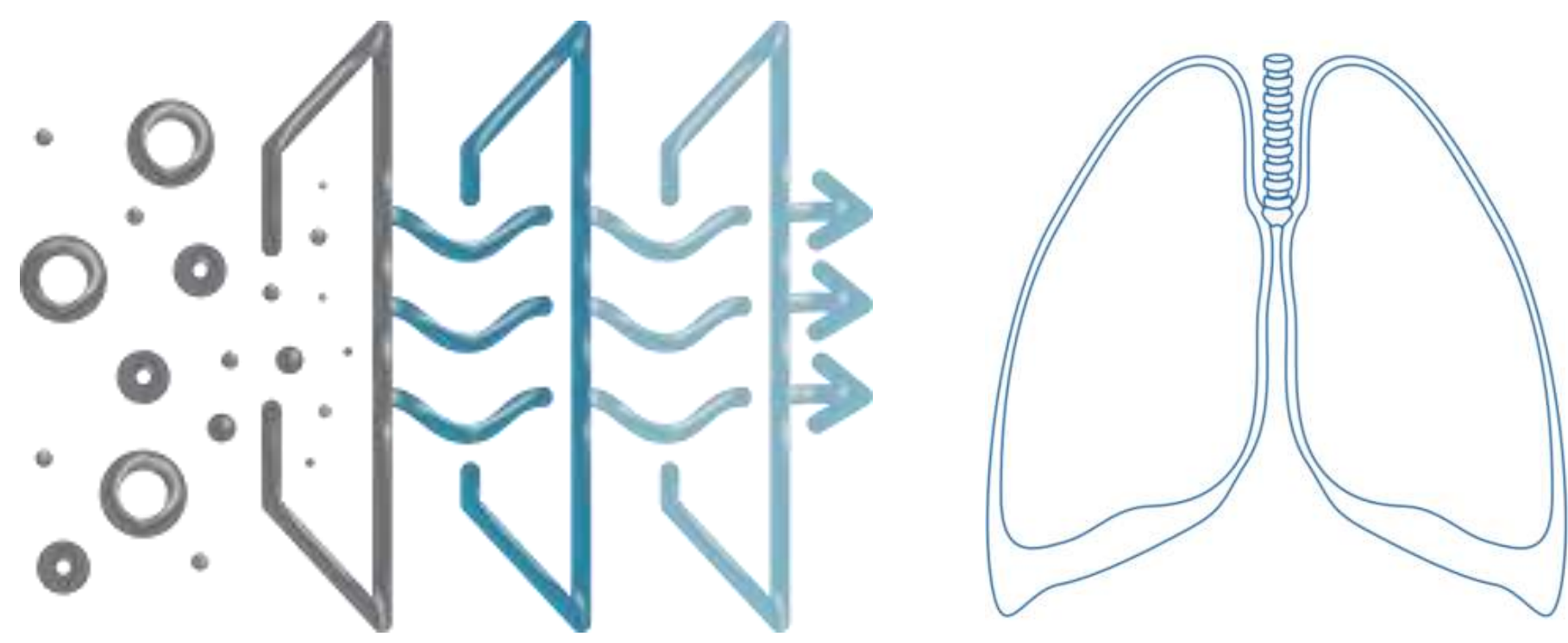
Xiao LEI is presenting his research on VOC adsorption in a furniture manufactory.



Researches Activities Funs

- Dr. Jinhan MO got the **First Prize** of Beijing Science and Technology Award (Ranking 3/15)
- Enze TIAN got the **Excellent PhD Student Award** at the International Conference for Global Chinese Academia on Energy and Built Environment (Chengdu, China), 2021.
- Enze TIAN got the **Distinguished Doctoral Thesis Award**, School of Architecture, Tsinghua University
- Qiwei CHEN got the **First Prize Award of Student Forum** at the 10th International Conference on Sustainable Development in the Building and Environment (SuDBE2021), Chongqing, China.
- Yilun GAO got the **Best Paper Award** at 10th Indoor Environment and Health Branch Conference (IEHB 2021), Wuhan, China.
- Wuwei ZOU got the **Prof. Xia Anshi Award**, Shanghai Jiaotong University, 2021.
- Wuwei ZOU got the **Excellent Graduate Award**, Beijing, 2021





Researches Activities Funs



Enze TIAN got the Excellent PhD student award at the International Conference for Global Chinese Academia on Energy and Built Environment (Chengdu, China), 2021.



Yilun GAO got the Best Paper Award at 10th Indoor Environment and Health Branch Conference (IEHB 2021), Wuhan, China.

SuD BE
CHONGQING

QW/CSSC 重庆前卫表业有限公司
Qianwei Meters (Chongqing) Co., Ltd.

第十届建筑与环境可持续发展国际会议SuDBE2021
“重庆前卫表业”学生论坛最佳学术报告评选结果

2021年12月10日，SuDBE2021国际会议学生论坛在渝顺利召开。来自全国20余所高校的56名学生经多轮选拔和激烈角逐，根据现场专家评审打分，最终在两个专题论坛中分别评选出最佳学术报告奖一等奖1名、二等奖2名和三等奖5名。现公示如下：

专题论坛一：绿色建筑与低碳节能

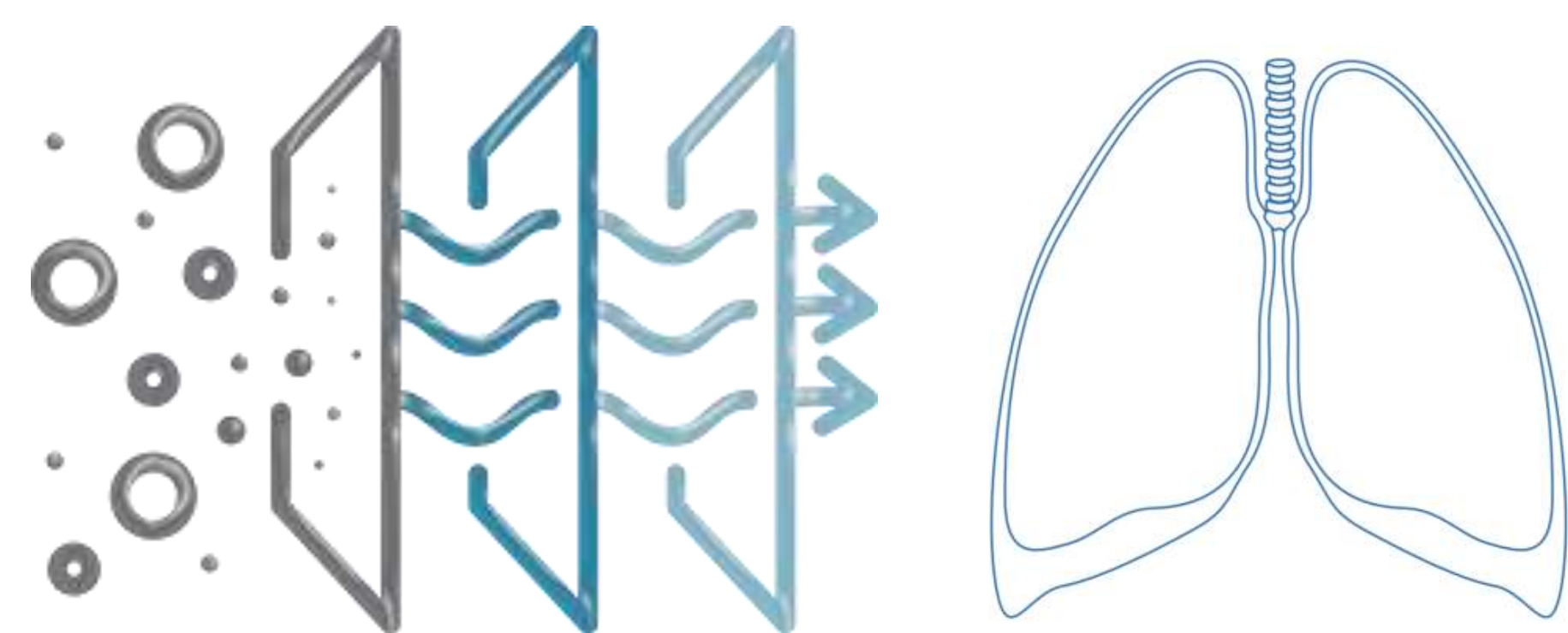
	作者	单位
一等奖	陈其威	清华大学
二等奖	谢李杰	重庆大学
	曾云一	清华大学
三等奖	苏蒙	山东建筑大学
	赵雅楠	北京工业大学
	刘鹏举	西安建筑科技大学
	吴浩然	东南大学
	孙梦晓	重庆大学

专题论坛二：室内环境与舒适健康

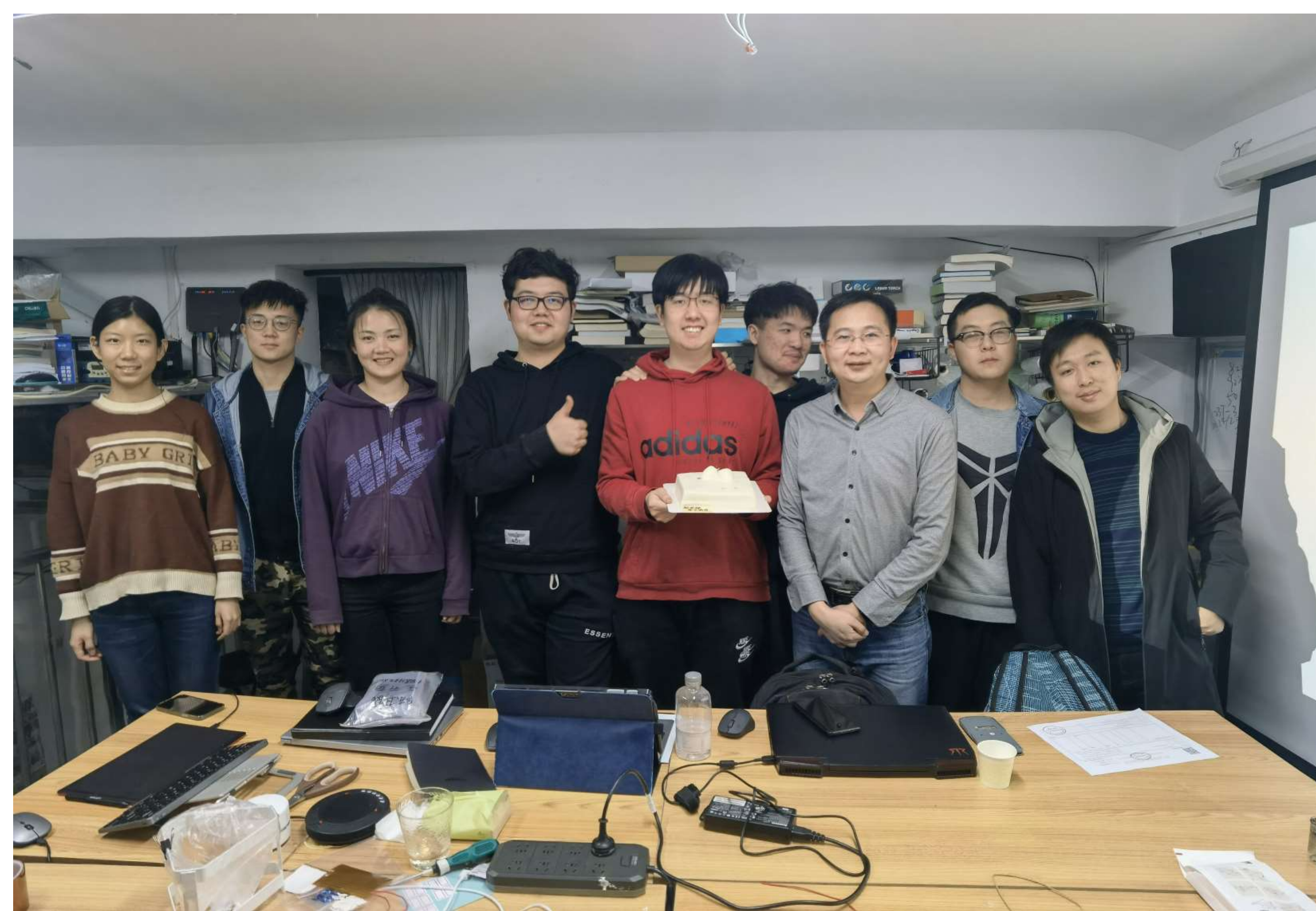
	作者	单位
一等奖	范敏超	天津大学
二等奖	王文博	英国雷丁大学
	张少星	重庆大学
三等奖	杨子旭	清华大学
	翟雪	天津大学
	肖亮	重庆大学
	韩尔东	重庆大学
	周姗	重庆大学

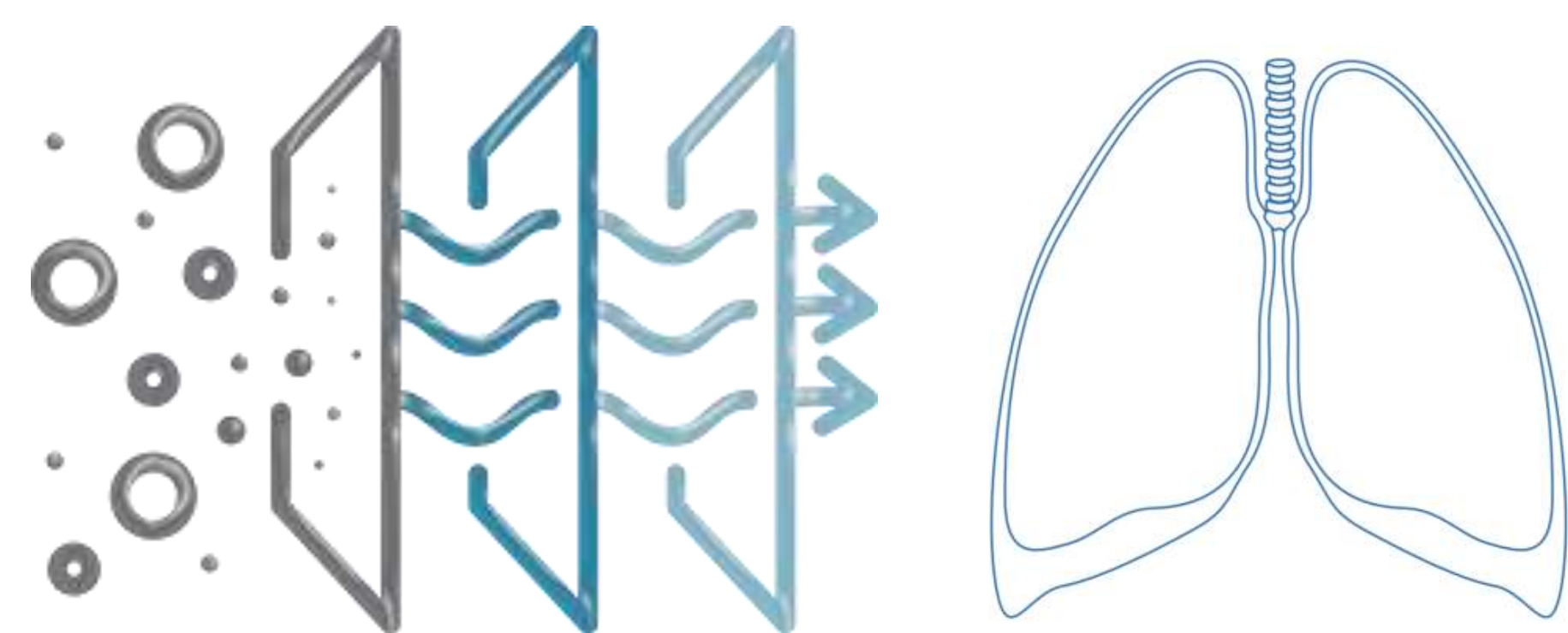
重庆大学土木工程学院
国家级低碳绿色建筑国际联合研究中心
绿色建筑与人居环境营造教育部国际合作联合实验室
重庆市绿色建筑与建筑产业化协会绿色建筑专业委员会

Qiwei CHEN got the First Prize Award of Student Forum at the 10th International Conference on Sustainable Development in the Building and Environment (SuDBE2021), Chongqing, China.

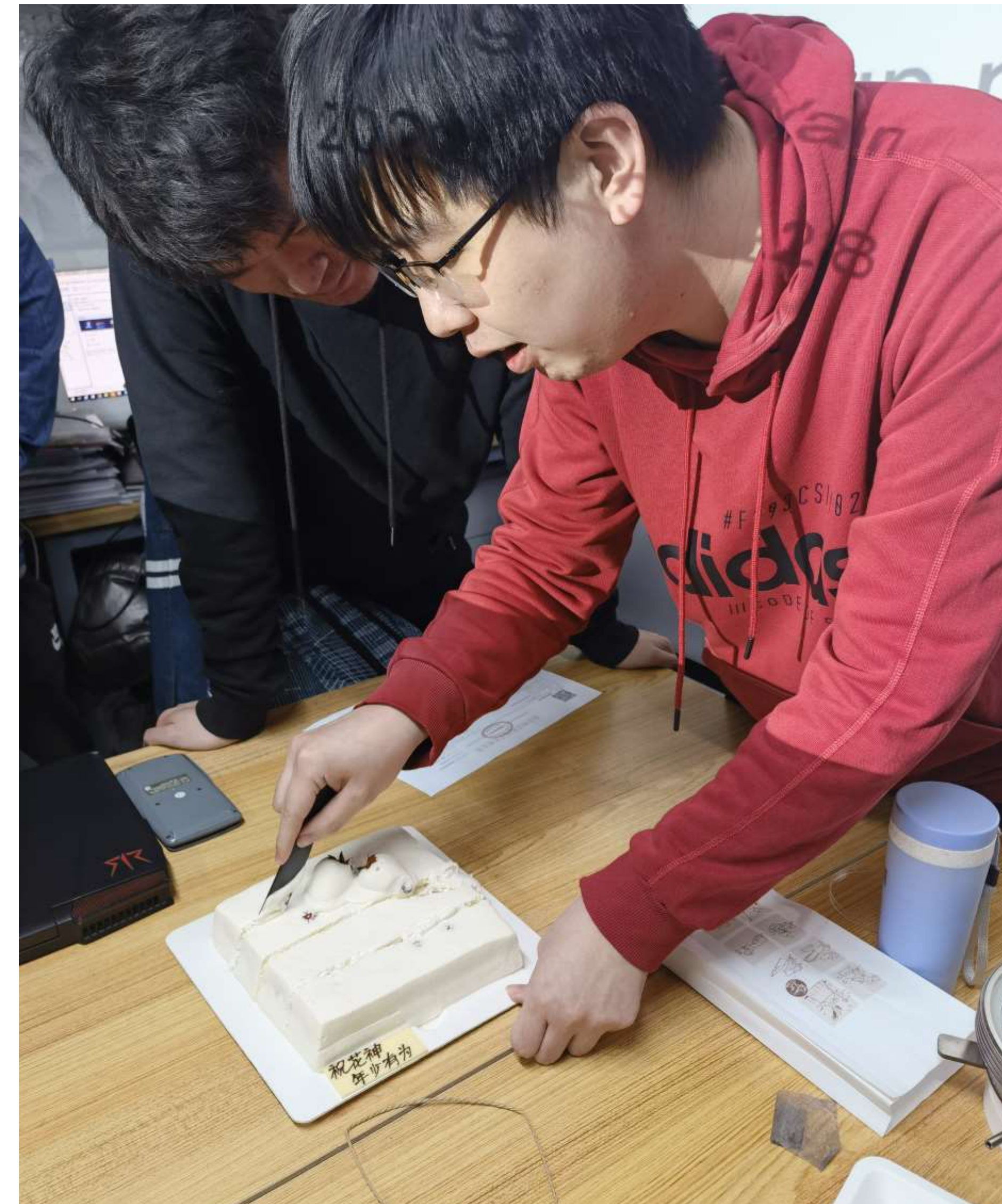


Researches Activities Funs





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Mo asks: Do you finish the paper?

Happy New Year 2022!

土木工務館

建筑学院
建筑技术科学系
School of Architecture
Department of Building Science

清华大学
绿色建筑设计研究中心
清华大学
绿色建筑设计研究中心

建筑环境与设备
研究所
Institute of Built Environment

清华大学
建筑环境与设备研究所
北京市重点实验室