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Technology Transfer Office



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TTO NEWSLETTER

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Success Story

Anti-Covid-19 stainless steel Technology

(Developed by Professor Mingxin Huang's team)

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SUCCESS STORY

Anti-Covid-19 Stainless Steel technology

New anti-Covid-19 stainless steel invention paves the way for mass sanitisation of public areas to protect public health and safety

Developed by Professor Mingxin Huang and Dr. Litao Liu



Professor Mingxin Huang and Dr. Litao Liu (From Left to Right)
Department of Mechanical Engineering,
Faculty of Engineering

When people infected with Covid-19 (SARS-CoV-2) breathe, speak, cough or sneeze, they emit virus-loaded droplets that can settle on and contaminate contact surfaces in public areas, such as door handles, stair railings and lift buttons, leading to contact transmission. These surfaces are frequently made from stainless steel and droplets can be detected on them for up to three days.

Despite its extensive use in public areas, ordinary stainless steel has no inherent anti-microbial properties. This makes virus transmission highly possible among people using these shared areas, particularly in large venues such as airports and public transport terminals.

By changing its chemical composition and microstructure, a new invention has successfully inactivated SARS-CoV-2 on stainless steel surfaces. The new anti-Covid-19 stainless steel technology destroys 99.75 percent of the SARS-CoV-2 virus present on surfaces within three hours and 99.9 percent within six

hours. It also kills the H1N1 virus and E.coli.

The invention will allow large public areas to be sanitized effectively and quickly. The findings were published in Chemical Engineering Journal on 25 November 2021 in a paper titled "Anti-pathogen stainless steel combating COVID-19". The invention won a silver medal at the Geneva International Exhibition of Inventions 2022 awards.

"In this latest breakthrough, the inactivation of pathogen microbes (especially the SARS-CoV-2) on SS [stainless steel] surface is achieved by tuning the chemical composition and microstructure of regular SS," said Professor Mingxin HUANG, whose project team at the Department of Mechanical Engineering of the Faculty of Engineering of HKU developed the invention.

The virus was quickly inactivated on surfaces of pure copper (Cu) and stainless steel with a high Cu content of approximately 10 percent by weight. The inactivation was achieved by using Cu ions that were released from Cu-rich precipitates, enabling the release of broad-spectrum antimicrobial properties.

Large amounts of Cu-rich precipitates are permanently present in the steel matrix, which enables this anti-pathogen stainless steel to inactivate pathogen microbes, even when its surface is continuously soiled. The anti-pathogen stainless steel can be mass

produced using existing mature powder metallurgy and modified traditional casting technologies.

A PCT (Patent Cooperation Treaty) has been filed for the research findings. The new stainless steel can be mass produced using existing mature technologies and the team has been working with industry partners to develop prototypes of products such as lift buttons, doorknobs, and handrails for further tests and trials.

The invention was developed by Professor Mingxin Huang and Dr Litao Liu from the Department of Mechanical Engineering, Faculty of Engineering, and Dr Alex Wing Hong Chin, Research Assistant Professor and Professor Leo Lit Man Poon of the School of Public Health, Faculty of Medicine, of HKU.



the anti-COVID-19 high Cu stainless prototype

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LATEST PATENTS FILINGS

20 June 2022 - 3 Jul 2022

IP01080 PCT filed on 21 Jun 2022
Prof. LI Xuechen; Development Of Synthetic Pseudaminic Acid-Based Antibacterial Vaccines Against Acinetobacter Baumannii

IP01087 USR filed on 21 Jun 2022
Dr. CHEUNG Jason PY; Lumbar Spine Anatomical Annotation Based On Magnetic Resonance Images Using Artificial Intelligence

IP01045 USR filed on 22 Jun 2022
Dr. CHU Zhiqin; Photonic Chip For Monitoring Activities Of Living Cells

IP01205 USP filed on 22 Jun 2022
Prof LEUNG Yiu Cheong; Rechargeable aqueous Mg battery with a solid-state polymer electrolyte

IP01187 CN filed on 23 Jun 2022
Prof. YEUNG William Shu Biu; 一种利用瘦素受体筛选子宫内膜间充质干细胞的新方法

IP01078 PCT filed on 23 Jun 2022
Dr TAN Siew Chong; System And Method For Stabilizing A Power Distribution Network

IP01209 USP filed on 23 Jun 2022
Prof. JOHN M NICHOLLS; The use of colorimetric reactions to evaluate specimen adequacy of rapid antigen tests/lateral flow tests

IP00889 EP regional phase filed on 23 Jun 2022
Prof POON Lit Man; Recombinant Viruses Expressing Alpha-1,3-Galactosyltransferase and Uses Thereof

IP01214 USP filed on 27 Jun 2022
Prof. Ning Xi; Muscle-like Actuators for Wearable Systems

IP00890 CN national phase filed on 27 Jun 2022
Dr HSIAO Hui We; Eye Movement Analysis with Co-Clustering of Hidden Markov Models (EMHMMwith Co-Clustering) and with Switching Hidden Markov Models (EMSHMM)

IP01066 US national phase filed on 27 Jun 2022
Dr WANG Weiping; Compositions And Methods For Optochemical Control of mTOR Signaling And mTOR-Dependent Autophagy

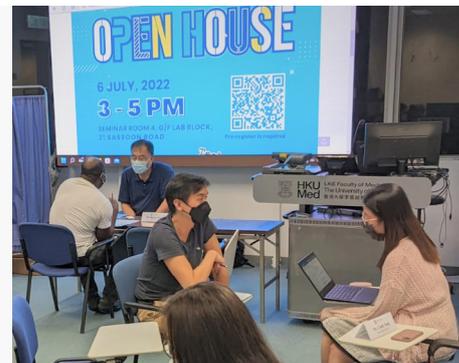
IP01222 USP App. 63/367,160 filed on 28 Jun 2022
Dr. Zhang Shipping; Regulating The Electrochemical Redox Behavior of Semiconducting Polymers on Soft and Stretchable Substrates and Methods of Use

IP01188 USP filed on 28 Jun 2022
Prof. SHUM Anderson Ho Cheung; Method for measuring the elasticity of microfibers at high throughput

IP01066 CN filed on 28 Jun 2022
Dr WANG Weiping; Compositions And Methods For Optochemical Control of mTOR Signaling And mTOR-Dependent Autophagy

IP01039 PH UM application filed on 30 Jun 2022
Dr. BAKER David; 一种珊瑚礁砖以及包括其的珊瑚生长装置

EVENT HIGHLIGHTS



Thank you to everyone who came to the TTO's third Open House held on July 6! We hope you enjoyed chatting with us and that we were able to address your questions about technology transfer to your satisfaction. If you weren't able to join us this time, remember you don't need to wait until the next Open House to get answers to any questions – just feel free to drop us an email anytime to tto_marketing@tto.hku.hk and we'll be happy to respond!

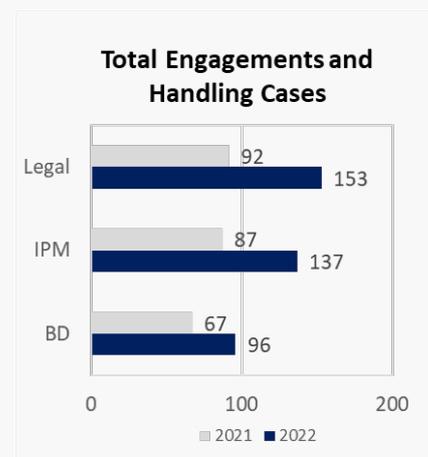
PROGRESS UPDATE

The Legal Team opened 153 new cases in June, up from 92 new cases in the same month last year. The team completed 54 cases this month, including 26 collaboration agreements.

The IPM Team received 10 IDFs in June, up from 9 a year ago. The team also filed 27 USP/PCT national applications, the same number as June 2021, and presented 12 Conversion/National Phase/National Validations cases in committee meetings.

The BD Team is handling 96 cases this month, up from 67 a year ago. Technology commercialization and

industry engagement comprise the bulk of cases (71).



TECHNOLOGY COMMERCIALISATION

Top 3 revenue-booked IPs in June 2022

| Item | IP Type | PI | Faculty |
|---------------|--------------------------------|-----------|-----------|
| e-form | Contract Research/ Consultancy | Versitech | Versitech |
| Kamei Chicken | Know-how | N/A | Science |

TRANSFERRING YOUR NEW TECHNOLOGIES INTO BUSINESS OPPORTUNITIES

POLICY STIPULATION

The latest policy stipulates that the net receipts arising from the exploitation of an Invention are shared among the University, the relevant faculty/department and the inventor(s) in the ratio of 1/3 : 1/3 : 1/3. It aims to encourage the researchers at HKU not only to excel in academic performance but also to apply their technology for the benefits of mankind with an impressive reward.

HOW TO APPLY: 4 PHASES FOR RESEARCH PROJECTS

Phase 1: Initial project negotiation

1. PI will negotiate with their collaborator(s) and confirm a project proposal which includes the scope, budget and duration of the project.

2. PI will negotiate with their collaborator(s) and prepare a draft agreement (Agreement templates are available at the website of the Research Services (RS): <http://www.rss.hku.hk/contracts/contractresearch/templates>).

Phase 2: Endorsement from department/faculty

3. PI will submit the project proposal, the draft agreement, and the information form/grant application form to their department/faculty to seek an approval (The information form for research/consultancy agreements is available at: <http://intraweb.hku.hk/local/rss/tto/researchor-consultancy-agreements-form.doc>).

4. After obtaining the approval, PI will

submit the project proposal, the draft agreement, and the information form/grant application form to the Research Service (RS).

Phase 3: Financial legal/IP review

5. The RS will distribute the project proposal and the draft agreement to the Finance and Enterprises Office (FEO) for financial review and to the Technology Transfer Office (TTO) for legal review.

6. If there is any financial/legal issue, the FEO/TTO will inform PI through the RS. PI will negotiate with their collaborator(s) on the financial/legal issue until it is settled.

Phase 4: Signature and document archiving

7. After consolidating the settled project proposal and the agreement, the RS will proceed to the signature process.

8. After duly performing the signature process, the RS will assign the RCGAS number(s) for opening the project account(s)

ABOUT US

About HKUTTO

The Technology Transfer Office (TTO) is committed to maximising the impact of research through technology transfer at both the institutional and industrial levels. TTO works closely with researchers at HKU to commercialise their inventions through professional consultation on business development, legal advice and assistance, as well as patent application filings. Your inventions will not benefit society unless they are mass produced.

About Versitech

Versitech Limited is the commercial arm of HKU. Versitech negotiates, executes and manages commercial business contracts and agreements on behalf of the University.

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