

TOKYO TECH  
Pursuing Excellence



# Development of Visible Light Driven Anti-Infection Textile

Tso-Fu Mark Chang, Yung-Jung Hsu and Masato Sone



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**Laboratory for Materials and Structures**



國立交通大學  
National Chiao Tung University

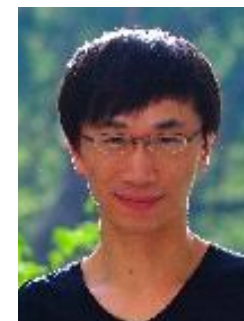


# Brief Biography of Prof. Yung-Jung Hsu

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## **Education:**

- Ph.D. in Chemical Engineering, National Tsing Hua University, Taiwan.
- B.S. in Chemical Engineering, National Tsing Hua University, Taiwan.



## **Professional Appointments:**

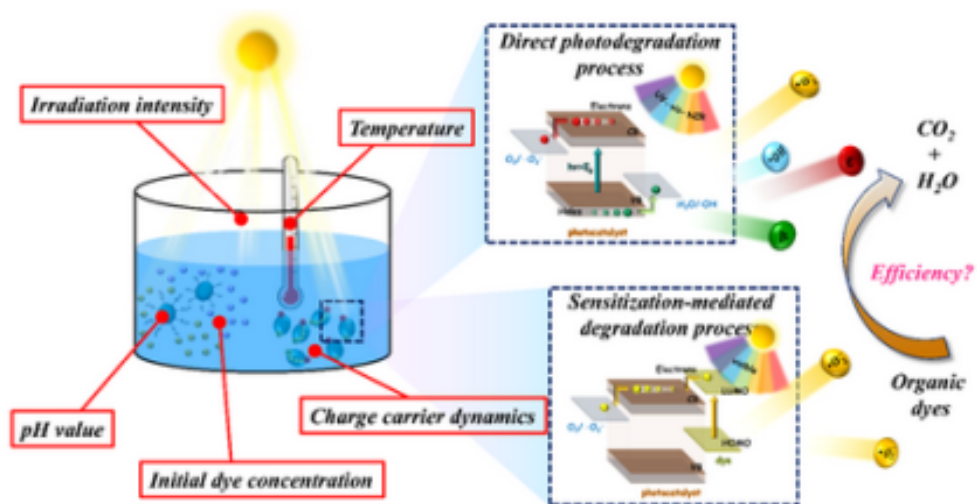
- Professor, Department of Materials Science and Engineering, National Chiao Tung University, Taiwan (2014 till now)
- Associate Professor, Department of Materials Science and Engineering, National Chiao Tung University, Taiwan (2010-2014)
- Assistant Professor, Department of Materials Science and Engineering, National Chiao Tung University, Taiwan (2007-2010)
- Associate Editor, Journal of the Taiwan Institute of Chemical Engineers (2017~2018)
- Reviewer Panel, RSC Advances (2018~now)
- Guest Editor for Special Issue "Metal–Semiconductor Nanoheterostructures for Photocatalysis Application", Molecules (2019)
- Director, Office of International Affairs, College of Engineering, National Chiao Tung University (2018~now)
- Editorial Advisory Board, ACS Applied Nano Materials (2020)

# Publication of Prof. Yung-Jung Hsu

## Google Scholar H-index = 41:

- 98 SCI papers
- 11 joint publication

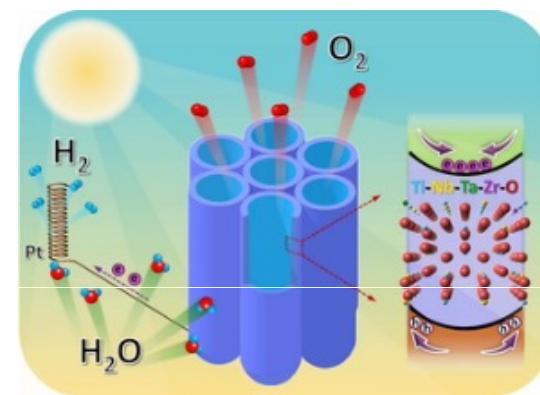
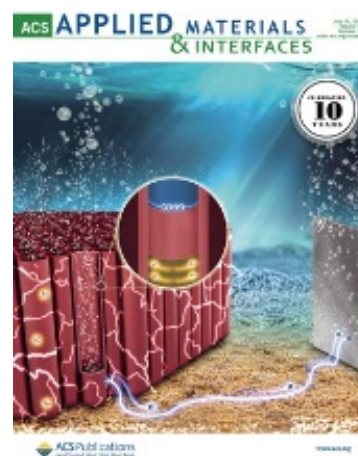
Yi-Hsuan Chiu, **Tso-Fu Mark Chang\***, Chun-Yi Chen\*, **Masato Sone, Yung-Jung Hsu\***, "Mechanistic Insights into Photodegradation of Organic Dyes Using Heterostructure Photocatalysts", *Catalysts* 2019, 9, 430. [Top 0.1% paper in materials science area]



Yi-Hsuan Chiu, Ting-Hsuan Lai, Chun-Yi Chen\*, Ping-Yen Hsieh, Kazunari Ozasa, Mitsuo Niinomi, Kiyoshi Okada, **Tso-Fu Mark Chang\***, Nobuhiro Matsushita, **Masato Sone, Yung-Jung Hsu\***, "Fully Depleted Ti-Nb-Ta-Zr-O Nanotubes: Interfacial Charge Dynamics and Solar Hydrogen Production", *ACS Applied Materials & Interfaces* 2018, 10, 22997-23008.

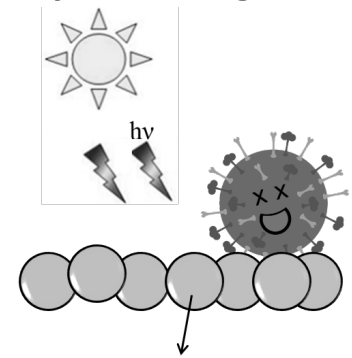
[Front Cover story]

[Top 10% paper in materials science area]



# Research Structure

## Photocatalytic disinfectant material driven by visible light (sunlight)

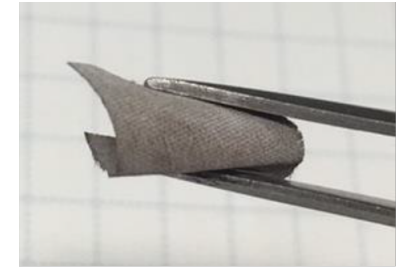


Disinfectant material

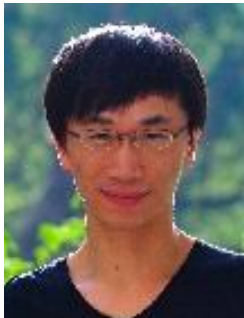


- Assist. Prof. T.F.M. Chang
- Tokyo Tech, Japan
- Integrate metal with polymer and metal with ceramic materials

## Integrate the disinfectant material with cloth textiles



Functional textile

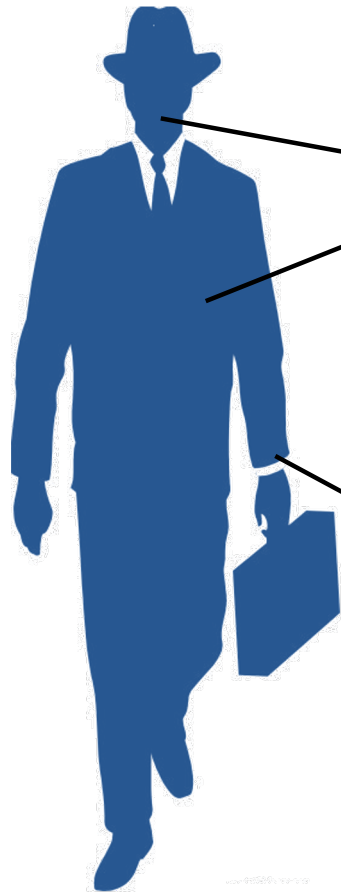
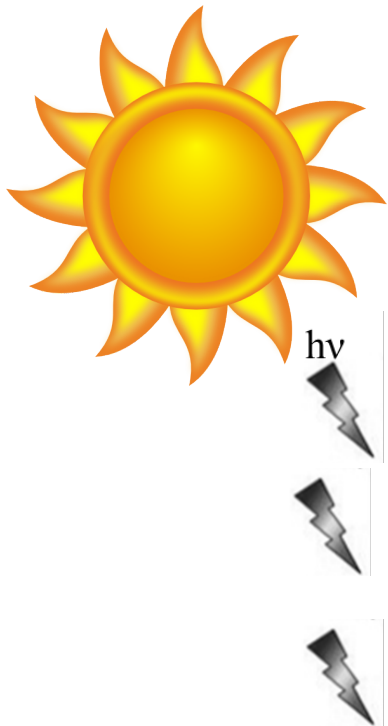


- Prof. Y.J Hsu
- NCTU, Taiwan
- Manipulate nanostructure of photocatalyst



- Prof. M. Sone
- Tokyo Tech, Japan
- Design surface condition of polymers

# Expected Result



## Anti-Infection Textile

Cloth



Mask



## Infection Risk Sensor



Detect signal generated from interaction between the possible harmful virus/bacteria and the disinfectant material



Thank You For Your Attention