

Gold Electronic Skins

Wenlong Cheng^{1, 2*}

¹Department of Chemical Engineering, Monash University, Clayton, Victoria 3800, Australia;

²The Melbourne Centre for Nanofabrication, Clayton, Victoria 3800, Australia;

E-mail address: wenlong.cheng@monash.edu

Abstract

Next generation of electronic devices will be not only flexible but also stretchable, enabling applications impossible to achieve with existing rigid circuit board technologies. This needs new materials and new design principles. Among various materials of choices, gold has advantages of biocompatibility, chemical inertness and band-gap-matching with a lot of semiconductors materials. In this talk, I will discuss the Monash e-skin-based wearable technology platform using ultrathin gold nanowires. We have demonstrated their applications in skin-like pressure sensors, strain gauge sensors and transparent energy storage devices. Our sensors can communicate via smartphone, indicating the potential of remote health management anytime anywhere. In comparison to other nanomaterials, gold nanomaterials offer the advantages such as good biocompatibility, chemical inertness and facile synthesis at large scale.

References

- [1] Bowen Zhu, Shu Gong, Wenlong Cheng*. Softening Gold for Elastronics. *Chemical Society Review*, 2018, accepted.
- [2] Qingfeng Zhai, Yan Wang, Shu Gong, Yunzhi Ling, Lim Wei Yap, Yiyi Liu, Joseph Wang, George P. Simon, and Wenlong Cheng*. Vertical Gold Nanowires Stretchable Electrochemical Electrodes. *Analytical Chemistry*, 2018, DOI: 10.1021/acs.analchem.8b03423.
- [3] Yan Wang, Shu Gong, Stephen J. Wang, Xinyi Yang, Yunzhi Ling, Lim Wei Yap, Dashen Dong, George P. Simon, Wenlong Cheng*. Standing Enokitake-like Nanowire Films for Highly Stretchable Elastronics. *ACS Nano*, 2018, 12, 9742-9749.
- [4] Yan Wang, Shu Gong, Daniel Gómez, Yunzhi Ling, Lim Wei Yap, George P Simon, Wenlong Cheng*. Unconventional Janus Properties of Enokitake-like Gold Nanowire Films. *ACS Nano*, 2018, 12, 8717–8722.
- [5] Shu Gong, Willem Schwalb, Yongwei Wang, Yi Chen, Yue Tang, Jye Si, Bijan Shirinzadeh and Wenlong Cheng*, A wearable and highly sensitive pressure sensor with ultrathin gold nanowires. *Nature Communications*, 2014, 5, 3132.