

## Graphene based Wearable Temperature sensor array with Heater for Healthcare Monitoring

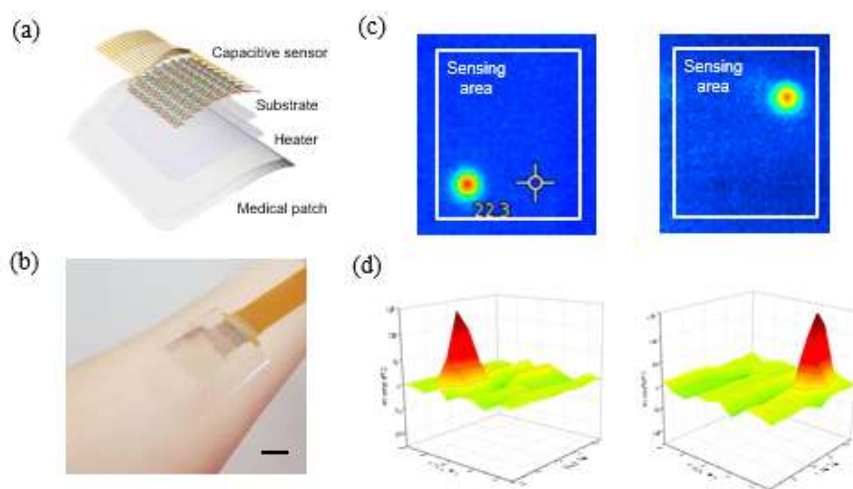
Precision temperature sensing of the skin can provide clinically relevant information about cardiovascular health, cognitive state and many other important aspects of human healthcare together with other measurements. Previous wearable temperature sensor studies which focused on single point temperature sensing could only provide limitative, simple information of human body.[1-3] However, detection of temperature distribution provide additional, advanced information and enable to dianosis various diseases and monitor the surgery region after operation. Measurement of the exact surface temperature distribution which directly address an important clinical need for management after operation is still challenging.

Here, we introduce an ultrathin, transparent, capacitive type sensor technology that can acquire continuous, accurate thermal distribution mapping of skin surface that are unavailable with previous methods. The heater mounted below thermal sensor enables various thermo-therapy. The good mechanical properties of graphene and the thin geometry of the device enable to make ultrathin devices which could make conformal contact with various targets. The performances of this system were well demonstrated by various in-vitro tests. It is expected that this monitoring and thermo-therapy will have significant contribution to the various bio-application treatment systems.

### References

- [1] R. C. Webb, A. P. Bonifas, K. A. M. Gorbach, J. A. Rogers, Nat. Mater. 12 (2013) 938-944.
- [2] X. Ren, K. Pei, B. Peng, Z. Zhang, Z. Wang, X. Wang, P. K. L. Chan, Adv. Mater. 28 (2016) 4832–4838.
- [3] R. C. Webb, A. P. Bonifas, K. A. M. Gorbach, J. A. Rogers, Nat. Mater. 12 (2013) 938-944.

### Figures



**Figure 1:** The structure of capacitive temperature sensor array and its electrical characteristics about temperature distribution mapping.