

## Silicon nanomembrane phototransistors meet smart materials for on-demand sensing platform

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### Abstract

Flexible integrated smart electronics presents great potential in wearable and portable systems ranging from health care to environmental monitoring. Sensing module which could detect and sense surrounding stimuli and output with digital signals is of great importance in these applications. Benefiting from the reliable and ultra-high on-off ratio ( $\sim 10^6$ ) of our flexible silicon nanomembrane phototransistor, we proposed a strategy to construct a platform with on-demand sensing functions combined with smart materials. Highly sensitive response to illumination of the silicon nanomembrane provides an ideal device to detect the variation of optical property change in above smart materials. This platform is capable in all kinds of sensing situations, as hydrogen and humidity, with the integration of corresponding smart materials and suggests a promising future for next-generation smart systems.

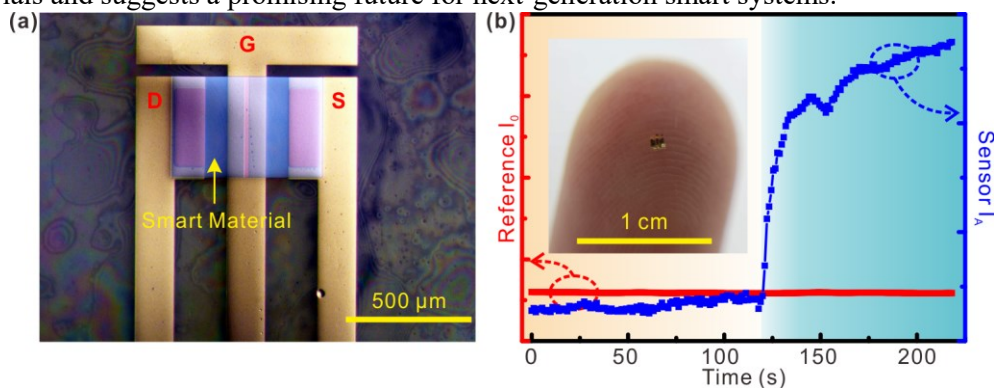


Figure 1: Versatile sensing platform based on silicon nanomembrane phototransistor. (a) Structure of phototransistor combined with smart materials. (b) Demonstration of sensing properties of the integrated platform.

### References

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