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Broadband Graphene Photodetectors for Monitoring Personal Wellbeing

Sensors for ubiquitous sensing purposes should be low-cost, invisible and seamlessly integrable with many different surfaces such as bendable plastic, textiles and glass. Graphene based light sensors [1,2] are inherently flexible and transparent and can be integrated with low-cost CMOS technology [3], hence providing a disruptive platform for future wearables and vision devices.

We will show a prototype non-invasive wellness monitor based on graphene-colloidal quantum dot hybrid photo detectors. We leveraged graphene's flexible and transparent properties to create a wearable device that is conformal to the human body so that it can reliably extract vital signs such as heart rate, breathing rate and oxygen saturation. We demonstrated wireless communication between the photodetectors and a smartphone, offering battery-free operation by employing heterogeneous integration of a flexible ultraviolet (UV) sensitive photodetector with a near field communication (NFC) circuit board.

References

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Figures

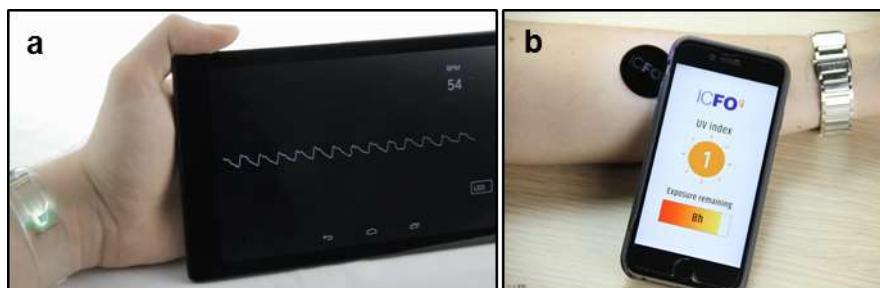


Figure 1: (a) Graphene based flexible and transparent wellness sensing platform.(b) Battery-less UV monitor powered via NFC communication.