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## **Carbon nanotube thin films for wearable electronics application**

Wearable healthcare devices have the potential to revolutionize preventive medical care and health promotion technologies. Carbon nanotube thin films are promising electronic materials for transistors and integrated circuits [1,2], biosensors [3], and other passive components to build flexible and stretchable devices with excellent wearability and performance because of the high-carrier mobility, mechanical flexibility, and biocompatibility. In the presentation, after reviewing recent progresses of carbon nanotube-based electron devices, our recent works on flexible integrated circuits and biosensors for wearable devices are introduced. A concept to design carbon nanotube-based analog integrated circuits, which are indispensable for sensor devices, is presented, with a demonstration of the first carbon nanotube differential amplifiers on a flexible plastic film. Energy harvesting technologies, which harvest electricity from small energy sources existing in environment, may be useful for the power source of wearable devices. The CNT-based transparent and stretchable triboelectric generators, utilizing the contact electrification and electrostatic induction, will be introduced. Some demonstrations such as driving 100 blue LEDs with a 5x5 cm<sup>2</sup> triboelectric generator, a generator-equipped gloves lighting with hand claps, and so on will be shown in the presentation.

### **References**

- [1] D.-M. Sun et al., Nat. Nanotechnol. 6, 156 (2011).
- [2] D.-M. Sun et al., Nat. Commn. 4, 2302 (2013).
- [3] W. Harreither et al., Anal. Chem. 85, 7447 (2013)