

Stretchable Platform Technology for Attachable Patch Device Applications

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Abstract

With the advent of Internet of Thing (IoT) era, wearable technology is expected to evolve into its unprecedented forms that people used to imagine only in various Hollywood movies, where our real hands are used to make a phone call or display information and clothes show viral signal of human bodies. So-called smart skins and fabrics with extreme conformability will have functions of detection, signal process and information display. How can we implement such a high level of electronics on a soft or stretchable platform? In this talk, I will share how my group has been trying to develop stretchable platform technology based on printing processes. Fundamental idea is isolating highly functional, typically rigid and brittle components, from any external deformation stress, by placing stretchable spring-like interconnect conductors in between. The platform technology transforms conventional printed circuit boards (PCBs) into stretchable ones by using several key enabling technology: strain-engineering to protect rigid components based on printed rigid island or pure epoxy banks; printed and automatic routing of stretchable interconnect conductors; bonding of surface mount devices (SMDs) of resistors, light-emitting diodes (LEDs), sensors, and integrated circuit (IC) chips onto stretchable printed pads with silver epoxy or liquid metal; stretchable via and crossover for integration of devices in an array format. While there are rooms for improvement in terms of resolution and high integration, our facile and scalable printing-based platform technology will make sure early advent of stretchable wearable technology in IoT applications and corresponding commercial markets.

Biography

Yongtaek Hong received B.S. and M.S. in Electronics Engineering, from Seoul Nat'l Univ., Seoul, Korea, and Ph.D. in Electrical Engineering from Univ. of Mich., Ann Arbor, MI, USA. From 2003 to 2006, he was a senior research scientist at Display Science & Technology Center, Eastman Kodak Company, Rochester, NY, USA. Since 2006, he has worked for Dept. Elec. & Comp. Eng., Seoul Nat'l Univ., now is a full professor. His research interests are printed/flexible/stretchable thin-film devices.