MSE-Colloquium@NTU

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Transparent and Flexible/Stretchable Electronics Fabrication by Laser Based Nanomaterials Processing

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Abstract

It is well expected that future electronics will be in the form of “wearable electronics”. The Google Glass and Apple’s iWatch are the first generation of wearable electronics. However, they are still mainly composed of rigid electronics even though the human body is soft and elastic. To realize more meaningful and practical wearable electronics, components should be stretchable or at least flexible. In addition, “transparency” will add more functionality to the users. We developed various systems – (1) hierarchical multiscale hybrid nanocomposites for highly stretchable, flexible or transparent conductors, (2) laser-based low temperature direct patterning processes, which are alternatives to conventional photolithography and vacuum deposition methods, and (3) large scale nanomaterials synthesis methods, which can ultimately be applied to wearable electronics applications. The hybrid nanocomposites combine enhanced mechanical compliance, electrical conductivity, optical transparency and electrical conductivity to provide efficient multiscale electron transport paths. Additionally, this approach combines “materials that stretch” and “structures that stretch” strategies to achieve highly stretchable conductors. Demonstrations, processes and materials development in our laboratory will be introduced.

Biography

Dr Ko Seung Hwan is a Professor in the Applied Nano and Thermal Science (ANTS) Lab at the Department of Mechanical Engineering in Seoul National University. Before joining Seoul National University, he was a faculty member at the Graduate School of EEWS (Energy, Environment, Water and Sustainability), KAIST Institute for the NanoCentury, and Department of Mechanical Engineering at KAIST. He received his Ph.D. degree in Mechanical Engineering from UC Berkeley in 2006 and worked as a researcher at Lawrence Berkeley National Laboratory until 2009. His research interests are flexible and stretchable electronics, direct nano-patterning and laser assisted direct patterning.

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