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Micro printing of metal nanoparticles for printed biodegradable trillion sensors

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Printed and biodegradable devices are a promising technology for up-coming trillion sensor universe, in which over trillion of networked sensors will be used a year for smart solution on global social problem, such as energy, food, manufacturing, infrastructure etc [1]. To achieve the universe with using 100-folds number of networked sensors and same order of current resource as current, at most 1% of cost and environment impact is indispensable for technical breakthrough. From the viewpoint, we investigated platform technology for printed biodegradable devices and here successfully prepared nano- and micro-printed pattern of metal nanoparticles on biodegradable polymer substrate for the first time.

Printing methods used here were temperate printing method, developed in our laboratory, and the procedure was written in previous papers [2, 3]. As the result, in Figure 1, a micro- printing pattern on PLA film is shown. The thickness of the PLA film was measured as ca. 150 μm and the metal pattern printed substrate also keep flexibility. From optical microscopic measurement, it can be confirmed that comb-shape pattern was transferred on PLA substrate and this shape was well consistent of the original micro pattern on the surface of template. Further, SEM image at the comb-shape pattern shows the pattern was consisted of Ag nanoparticle with the original size of the nanoparticle of the ink we used. On the presentation, we will discuss the micro printing of metal nanoparticle for printed biodegradable devices from the viewpoint of deference on biodegradable materials, surface roughness and morphology, basic physical properties of materials such as contact angle and solubility, to consider adaptability of biodegradable polymer for printed electronics and devices.

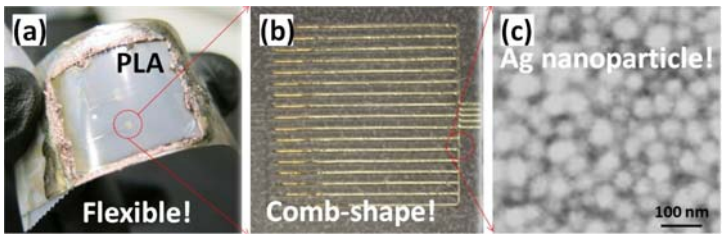

Figure 1. Microprinting of Ag nanoparticle on PLA film.

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Reference

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