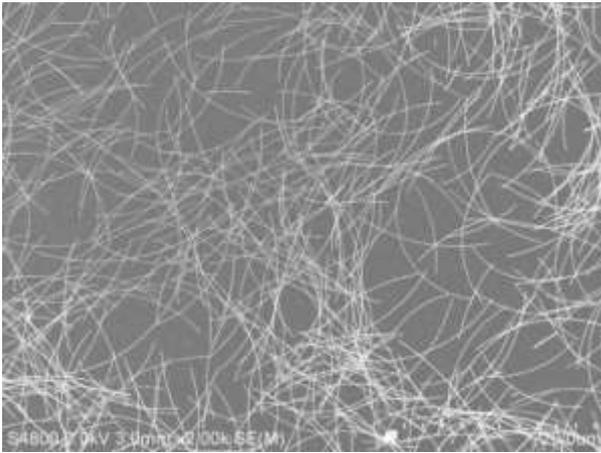


April 8, 2015

Dai Nippon Printing Develops Transparent Conductive Film Using Nano-Scale, Ultrafine Silver Wires

Starting with touch panels, applications to be expanded to new optical composites



Transparent conductive film containing silver nanowire

Dai Nippon Printing Co., Ltd. (DNP, Head Office: Tokyo, President: Yoshitoshi Kitajima, Capital: ¥114,464 million, ~\$9.6 billion US) has developed a high-performance, low-cost transparent conductive film using nano-scale (nm: 10^{-9} meter), ultrafine silver nanowires by taking advantage of coating technologies cultivated in its optical film business. The Company has launched shipments of samples this April 2015, and will commence mass-production for touch sensors this summer. DNP aims to commercialize novel film products by combining other functions into optical films for various sensor applications and beyond.

Development Background

In recent years, the market for touch panel-equipped products has continued to expand, and in turn, to demand transparent conductive films, which have ever higher performance and more reasonable costs.



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Consequently, DNP and Innova Dynamics Inc., a venture company that develops and produces proprietary silver nanowire inks, have succeeded in jointly developing advanced transparent conductive films. DNP has established mass production with its inherently low-cost, wet coating technologies. With lower sheet resistances than the industry standard, indium-tin oxide (ITO) film, DNP will deliver transparent conductive films that cost-effectively enable larger sizes of touch sensors for notebook computers. The new product has excellent bendability, making it ideal for innovative new designs such as flexible displays and sensors for wearable devices.

Product Features

- The newly developed film product uses ultrafine silver wires as electrical conductors (thousands of times thinner than human hair), which preserves high light transmittance and excellent visibility. This is ideal for touch panels used in smartphones and tablets.
 - The sheet resistance value of $50\Omega/\square$ (ohms per square: resistance per unit area) is about half that of ITO film, and as a result, is suitable for larger devices such as notebook and All-in-One PCs.
 - Furthermore, the newly developed film product can be applied not only to touch panels, but also to numerous other solid state devices that require transparent conductive electrodes such as smart windows, OLED lighting and thin film photovoltaic cells.
 - With excellent bendability, the film product can be produced at 50 micrometers ($\mu\text{m} = 10^{-6}$ meter) or thinner, and used for foldable touch panels, wearable devices or 3D molded bodies.
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Looking Ahead

DNP will initially sell transparent conductive films as a superior alternative to ITO films for touch panels. Following this, DNP intends to integrate this new conductive film product with other optical functions such as antireflection or darkening from liquid crystals (shading), areas where DNP has considerable



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strengths. At the same time, DNP will develop various sensors suitable for social needs and explore new business models as well. In this new field, DNP targets total sales of 7 billion yen (~\$60 million US) by fiscal 2017.

* Product prices, specifications and service contents mentioned in this news release are current as of the date of publication. They may be changed at any time without notice.