NEC develops organic radical battery for practical use

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NEC Corporation announced today the development of a thin and flexible Organic Radical Battery (ORB) that is significantly more reliable and produces 1.4 times more output than existing units.

These prototype ORB maintain nearly full capacity, even after repeated charge-discharge, due to anodes that feature the same carbon material as lithium-ion batteries. The new Organic Radical Battery also produce 1.4 times more output than existing units due to the development of new highly conductive cathodes. Furthermore, these ORB are the size of a coin, 0.7 mm thin, and boast a capacity of 5mAh.

The prototype Organic Radical Battery enables more than ten consecutive flash firings approximately twenty thousand times, and facilitates continuous high luminance LED flash emission, which is difficult to perform on compact double-layer capacitors. Moreover, the ORB is suitable for next-generation ubiquitous terminals that require flexibility and high output, including IC Cards, wearable terminals and flexible electronic paper.

Characteristics of the technologies:

1. Anodes made with carbon / high reliability
ORB anodes feature the same carbon material used in rechargeable lithium-ion batteries, rather than the thin metallic lithium film used with conventional ORB. As a result, the new ORB are approximately 1/10 the cost of existing units and exhibit comparable reliability to commercially

available rechargeable lithium-ion batteries in repeated charge-discharge cycle testing.

2. 1.4 times higher output enabled through new composite cathodes
A highly conductive nano-composite cathode was developed by converting solid organic radical material into a gel and uniformly compounding it with carbon materials. As a result, the output per battery with a capacity of 5mAh increased to 7kW/L, 1.4 times the level of conventional units.

Research and development was partially carried out by the "Basic Technology Development for Fiber Materials Having Advanced Functions / Development of Battery Components to Enhance Performance and Functionality" project, sponsored by the Ministry of Economy Trade and Industry (METI), as well as the New Energy and Industrial Technology Development Organization (NEDO).

These technologies will be exhibited at NEC's "C&C User Forum & iEXPO 2010" held on 11 - 12 November 2010 at the Tokyo International Forum (Yurakucho).

Source: NEC