

主 論 文 要 旨

論文題名 **Study on the method to compose a wireless urine-powered urinary incontinence sensor system**

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主論文要旨

This paper presents the principles of wireless self-powered urinary incontinence sensor system that informs wirelessly the nursing attendants of urinary incontinence, and the method to embed the sensor in diapers. This system uses a urine-activated device in which urine acts as an electrolyte and drives a wireless transmitter. Moreover, as its application, we described how to make a wireless self-powered sensor system with sap-activated device for plant health monitoring.

Urinary incontinence is a common symptom in children and elderly people which affects seriously the quality of life of the patients and carers'. Sensors which detect automatically the urinary incontinence and inform the carers are effective for the treatment of urinary incontinence. The problems of recent urinary incontinence sensors are: (1) sensors need to be washed before reuse, (2) battery prevents to reduce the size of sensors and (3) battery needs to be changed. To solve these problems, we proposed a self-powered urinary incontinence sensor system using disposable urine-activated device. First, we proposed an intermittent-power-supply scheme which enables to drive the output load using a urine-activated device with large internal resistance. Secondly, we fabricated a urinary incontinence sensor system with a urine-activated device. It is composed of a coin-type urine-activated device, an intermittent-power-supply scheme circuit and a wireless transmitter. We evaluate this system and indicate that it can receive the wireless transmitted signal using the power of the urine-activated device. Furthermore, we proposed a flexible wire-type urine-activated device embedded in diapers and a power supply circuit with an intermittent-power-supply function, and gave ID information to the wireless transmitter. Finally, as an application of urinary incontinence sensor system, we fabricated a wireless self-powered sensor system with a sap-activated device for plant health monitoring. We proposed an intermittent-power-supply scheme circuit with a divided-power-line, and proved the usability of the system.