

## Development of a health monitoring system for chickens by using wireless sensors

### Anticipated application for the early detection of avian influenza outbreaks in poultry farms

We have developed a health monitoring system for chickens, which could facilitate the early detection of avian influenza outbreaks in poultry farms, by using wireless sensors.

This system consists of shoulder-mark type wireless sensor nodes with temperature and acceleration sensors, having the shape of a one-yen coin with a weight of less than 3 g (including the battery), and a network system which monitors the health of a chicken herd using the temperature and physical exertion data received from the nodes. This system allows constant monitoring of a chicken herd, facilitating the early detection of suspected avian influenza infection in the herd through real-time access to a database. The database used in this system, which is the first of its kind, was constructed on the basis of experimental data on the changes in temperature and reduction in physical exertion as well as modes of transmission of highly pathogenic avian influenza viruses in chickens.

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AIST TODAY Vol.10, No.3, p.12 (2010)



A chicken wearing the shoulder-mark type wireless sensor node

## Metrology and Measurement Science

## A technique for evaluation of long-term stability of thermocouples at high temperatures above 1000 °C

### Development of cobalt-carbon eutectic point for thermocouple calibration

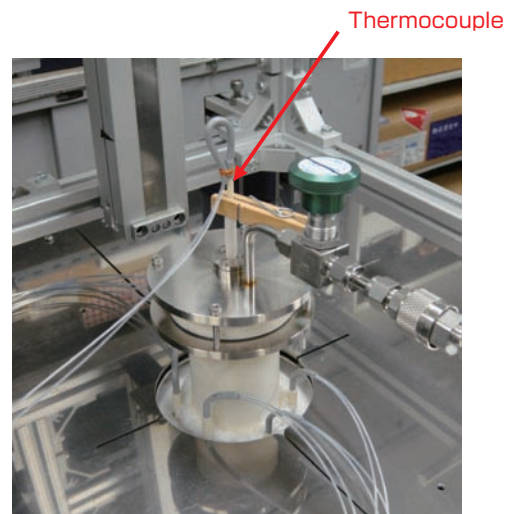
Thermocouples are widely used in industry to measure high temperatures. However, their electromotive force changes (drifts) when exposed to high temperatures, and therefore the evaluation of the drift is very important to establish reliable measurements. To monitor the drifts accurately, a stable fixed point is usually used as a reference. As recently reported, the metal-carbon eutectic points are found to be practical reference points for the calibration of thermometers. In our project, cobalt-carbon (Co-C) eutectic (1324 °C) cells for thermocouple calibration were constructed and evaluated. Based upon this development, thermocouple calibration service is provided at the Co-C eutectic point by National Metrology Institute of Japan, AIST.

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AIST TODAY Vol.10, No.1, p.23 (2010)



A thermocouple inserted into the Co-C eutectic point cell