Holst Centre (/)

Flexible RFID-sensor tag could reduce global food waste

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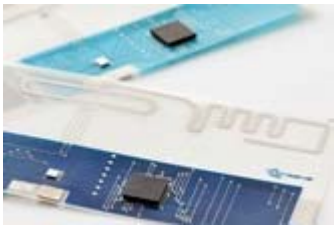

The pan-European CATRENE-Pasteur project has demonstrated flexible tag that could be used to track and monitor the quality of food in the supply chain. Combining radio frequency identification (RFID) with multiple sensors, the tag attaches to bulk transportation containers and gives a realistic, continuously updated estimate of how long the food they contain will stay fresh. This could help food distributors optimize their supply chain to minimize the amount of food that is spoiled before it reaches the retailer.

Multiple studies have found that around 40-50% of all food produced is wasted, with around 10-15% of global food production wasted in the cold supply chain alone. This has a huge impact on food costs and the world's ability to feed itself. It is also a major environmental issue as the production and transportation of food that will just be thrown away is a significant contributor to global greenhouse gas emissions. To address these issues, the CATRENE-Pasteur project was launched in 2009 to develop a wireless sensor platform for monitoring the environmental conditions of perishable goods throughout the supply chain.

The program recently closed by announcing a technology demonstrator that integrates an RFID chip, microcontroller and sensor IC into a flexible tag. The sensor IC, which will be made commercially available later this year, incorporates temperature, relative humidity and light sensors, allowing it to monitor the quality of a wide range of foods.

"The success of the Pasteur project has shown how subsidized projects can bring together partners who don't usually work together and deliver results. We are now looking to move to the next level by initiating projects focusing on software, RFID gateways and complete systems. This will allow us to create volume demonstrations and bring the tag to market," says project coordinator Romano Hoofman of NXP Semiconductors.

Researchers from Holst Centre and imec played a key role in integrating the ICs into the flexible tag. This involved developing new low-temperature encapsulation techniques that wouldn't damage the low-cost plastic substrate used in the tag. To integrate the sensor IC, the team developed a new process that protects most of the chip but leaves the sensing area exposed to make measurements. This process attaches the IC to the encapsulation material using an adhesive conductive film that is then accurately trimmed to the required size and shape using laser to ensure the sensing area is left uncontaminated.

Holst Centre and imec were also involved in developing additional gas sensors that could eventually be incorporated into a second generation of the tag to monitor the controlled atmosphere in which many foods are packaged. By creating ultra-thin metal oxide films, the team was able to enhance the sensitivity of oxygen and carbon dioxide sensors. The resulting oxygen sensor delivers state-of-the-art sensitivity but, unusually, operates at

room temperature, reducing power requirements. For the carbon dioxide sensor, the team achieved unprecedented sensitivity in the 300-5000 ppm concentration range used in food packaging applications. Both sensors have been realized as standalone demonstrators.

The CATRENE-Pasteur project was funded by the governments of Austria, Belgium, the Netherlands and Spain. For more information, go to **www.pasteur-project.info (http://www.pasteur-project.info/)** .

See also:

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