3M Unveils Multi-Bit Transponder and Other Progress in Developing Low-Cost Organic Chips for RFID Applications

- Achievements and Challenges Are Outlined at 'Smart Labels' Conference -

Addressing a conference here devoted to radio frequency identification (RFID) technology for retailing, security and other applications, a 3M scientist today presented a paper unveiling the company's progress in creating organic semiconductor chips that could pave the way for mass production of low-cost RFID tags.

With major retailers having indicated they will soon require RFID tags to replace bar codes as a more efficient means of tracking and controlling inventory, lower-cost non-silicon-based integrated circuits could significantly reduce the financial burden this change would impose on companies that supply products to retailers. Plastic-based chips may provide a solution, if they can be engineered to achieve the required level of performance.

At the Smart Labels conference at Boston's Longshore Marriott hotel, Dr. Paul Baude, who is heading the Pentacene RFID program at 3M, reported on the development of a multi-bit transponder on chips using a vapor-coated organic semiconductor known as pentacene. The circuits are patterned on a glass substrate with laser-ablated polymer shadow-masks. The transponders are directly powered by alternating current, eliminating the need for diodes.

Baude said these are significant milestones toward a commercially viable low-cost organic chip, but added that several technical challenges must still be overcome before organic semiconductors become a feasible substitute for silicon in RFID applications. "Pentacene-based RFID transponder development is at the R&D feasibility stage, and this work illustrates the utility of using these low-cost-based materials and manufacturing schemes for simple RFID applications," according to Baude.

The paper presented by 3M is the work of Baude and 3M scientists David Ender, Tommie Kelley, Michael Haase, Dawn Muyres, and Steve Theiss.

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