

# Secure Identification of Textiles and Other Consumer Products

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## Technology Summary

Researchers at ORNL have developed an invisible marking system for textiles and similar products that could save governments and businesses millions in lost revenues and legal fees. In addition to information required by law, useful tracking and inventory information can be embedded in the tags, as well as valuable consumer information on content and point of origin of materials.

Each year unethical units in the enterprise supply chain falsify operational data and business information to avoid paying import tariffs and related taxes and to deceive suppliers, wholesale and retail businesses, and customers alike. The issue is particularly problematic with textiles and similar “soft” materials, where reliable labeling is difficult without damaging the product. The ORNL technique has been shown through extensive testing to be resilient to manufacturing processes while still maintaining desired fabric properties. It can be used with a wide range of materials, from woven and nonwoven fabrics, including even thread and yarn, to cardboard, metal, concrete, plastics, leather, wood, and paper (e.g., currency and identification cards). And the complexity of the information that can be encoded with the system makes counterfeiting difficult.

Remarkable in its simplicity, the system consists of just three parts: a tag, the method to apply it, and an apparatus for detecting and reading the tag. The tag is a fluorescent material invisible to the human eye under natural or room lighting that fluoresces when illuminated by a light source with select spectral emission properties. It can be applied in the form of alphanumeric characters; trademarks; geometric symbols; or a readable pattern, such as a barcode, and as such can incorporate additional information of use to manufacturers and consumers. The tag can be applied by a variety of methods, including inkjet-type print heads and stamps. Detectors can be handheld and include light emitters with selectable spectral properties and the means to read, process, and display information from the emitted signal. The detectors can also be wired or wirelessly connected to existing enterprise systems and databases for storing the information.

## Advantages

- Nontoxic
- Highly flexible
- Invisible in natural light
- Doesn't affect product quality
- Difficult to duplicate/counterfeit
- Survives manufacturing processes such as bleaching, mercerizing, and dyeing
- Portable
- Inexpensive

## Potential Applications

- Customs inspections
- Counterfeit prevention/detection
- Production/shipment tracking
- Quality control
- Identification of U.S. materials or goods
- Verification of material content and manufacturing processes
- Inventory control
- Reclamation and remediation

## Patents

Linda A. Lewis, Glenn O. Allgood, and Robert Smithwick III. *Invisible-Fluorescent Identification Tags for Materials*, U.S. Patent Application 13/026,016, filed February 11, 2011.

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