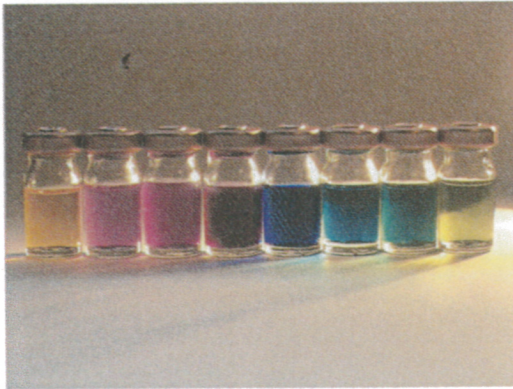


## actiLOR, a new generation of **multifunctional inks**

*Multilevel features aim to cover many – ideally all – levels of security. Swiss technology group U-NICA has developed a security ink that unites “overt, covert and forensic”. The product, called actiLOR, was presented at this year’s Intergraf conference in Barcelona.*



The name of this security ink, actiLOR is a combination of the words ‘active’ and ‘colour’ and already describes its function. The ink is optically variable, changing from a basic colour such as purple to a yellowish and almost transparent colour under the influence of sunlight or normal daylight. When

the light source is eliminated, the pigments return to their original colour.

About 30 years ago researchers cultivated organisms, which react to light. The source material on which this action is based is called rhodopsin. Rhodopsin has been much researched and is widely used in the pharmaceutical industry. U-NICA has developed a DNA process to change the source material so that it can be used in security inks by extracting an amino acid sequence and protein from the rhodopsin using a biochemical process. In a further process the proteins are encapsulated into a chemically stable pigment, which forms the base material for actiLOR.

*actiLOR pigments and its security application on Visa-sticker  
toprightcolumn:  
Light activated actiLOR in different color variations*

### Verification and printing

The ink is visible to the naked eye, and it reacts to light, both natural and artificial. For verification, a simple detector has been developed, which is based on a LED and a measuring diode that are used to read the transition between the basic purple and



yellow; a measurement that determines whether or not actiLOR is present.

The ink is applied through screen printing, both flatbed or rotary. The ink is water-based, but UV and solvent-based varieties are also available. A gravure ink is in the process of development and is expected to be ready by the middle of next year. The basic colour of the ink is purple, but this can be changed to a blue or red shade to suit the design of the banknote or document. The reaction time of the ink is usually about two seconds, but this can be varied from about one to five seconds.

Paper-based applications such as documents, certificates, passports and visas are being tested in security markets with U-NICA’s partners, but there are also foil-based applications, such as thin films in passports. The company also developed a unit for hot lamination of security foils.

### Personalisation

One remarkable feature of the ink is that it can store information. As it changes behaviour when scanned by a laser, it can be personalised. In one such application, ‘polarisation storage’, two pieces of information can be introduced in the same position. That means that a picture can also contain a barcode visible under polarised light when the viewing angle is changed. For example, in an ID card a barcode can be used as secondary storage for the printed information alongside the electronic storage. The backlight of a mobile phone can be used to reveal this information.

As the behaviour of the basic material can be changed by changing the DNA the reverse is also possible by detecting which DNA was used in the product. This enables the ink to be traced and tracked to the printer or end customer.

The product offers thus level one and level two functionality, and it is also a level three feature. Additionally there is the possibility of optical data storage, with a capacity of about one megabyte per square centimetre.

## Biometric recognition systems inherently fallible

*From the USA and Europe to India, biometric systems - designed to automatically recognize individuals based on biological and behavioural traits such as fingerprints, palm prints, or voice or face recognition – are increasingly used in ID and border control systems. But doubts about these systems persist.*

Biometric recognition systems are “inherently fallible,” and no single trait has been identified that is stable and distinctive across all groups, says a new report by the US research group,

the National Research Council. To strengthen the science and improve system effectiveness, additional research is needed at virtually all levels of design and operation, the report insists.