

Plagiarism protection & process control

Materials and products are tagged in order to identify them during production and transport, for trade and application. Barcodes and RFID tags are widely used. Other marks are also used to verify the genuineness of a product. Such marks can be read directly as e.g. hologram labels or they require a reader instrument. In any way the tag must be complex and complicated to imitate.

Often the tags are incorporated in dedicated labels. We have filed a patent about marking the actual material and about the cost efficient production of forgery protection labels. The technology is based on the use of fluorescing dyes.

Many organic materials fluoresce, i. e. if they are irradiated with light of a particular wavelength (colour) they absorb this light and emit light with a longer wavelength (other colour). Some dyes show a fluorescence effect which depends on the molecules environment. The surrounding molecules influence the intensity and the wavelength of the fluorescence light. For example, the fluorescence may depend on the pH or the ionic strength of the medium. Other dyes react on the viscosity of the matrix. They show a stronger fluorescence in a solid than in a solution or in a highly cross-linked resin than in a less cross-linked one.

These properties can be used to tag materials and coatings. For this purpose a dye is used the fluorescence of which depends on the chemical and the physical properties of the material where it is added to. The fluorescence depends, for example, on the exact chemical composition as determined by the ratio of components. The degree of curing or the cross-linking density of a resin can influence the fluorescence too. If two or more dyes are added to the material which differ in their fluorescence response to the material properties a system can be prepared which is extremely difficult to imitate.

Fluorescence can be detected with an extremely high sensitivity. Thus, only a very small concentration is sufficient for the identification. For coatings with a thickness of 1 micron or less a concentration in the order of some ppm (parts per million) is required. Such small concentration in a thin layer is not visible at all and it does not affect properties like mechanical strength. The chemical analysis of such an amount of additives is virtually impossible.

The technology can also be used for the control of coating processes. Depending on the dye properties, the chemical composition, the drying status, or the thickness of the coating can be monitored.

Application areas:

- products made of materials with specific properties
- packaging materials e.g. for drugs
- security label
- quality control in general, inline quality control in the production of materials with critical composition or in coating processes
- ...

We are looking for partners who want to apply the technology

For more information please contact:

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