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Research area: Product aims

End products made of paper, paperboard and board // Other

Key words:

Superparamagnetism, nanoparticel,coating, functionalisation

TITLE:**New product protection by using of superparamagnetic nanoparticles****Background/Problem area**

The imitation or counterfeiting of products is a problem that leads to high economic losses. Despite manifold possibilities to protect products against counterfeiting (eg, holograms, micro-tagants), the number of counterfeits and thus the economic loss constantly rise. Counterfeit products to manufacturers of branded products created according to estimates by the European Commission every year a loss of about € 300 billion. The Organization for Economic Cooperation and Development (OECD) is based on a claim in the amount of approximately € 500 billion. For this reason, the product protection is an emerging area which has currently about double-digit growth rates. The market for this type of security technology is used by the industry currently valued at approximately € 4.5 billion.

In addition to a legal protection of products, there are also a number of technical aids for the protection of branded goods. The following considerations should be considered when choosing an appropriate method, but always respected. The protection should be:

- exclusiv
- firmly connected with the product
- visible and invisible elements contained
- easy to control and detect
- not to copy, modify, or remove
- a reasonable cost / benefit ratio

The use of such tools should always be accompanied by a strictly complied internal security plan.

Objectives/Research results

The objective of this research project was to develop a printing ink or a coating material that protects against counterfeiting of products. As a safety feature superparamagnetic nanoparticles were used. These can be heated by alternating fields, and have no remanent magnetization after irradiation. Both the incoming heat and the absence of evidence remanet magnetization can be easily measured. To implement the project, it was necessary to adapt the established sol-gel technique onto the field of printing ink. The selective use of the properties of the nanoparticulate superparamagnetic particles in the coating composition and printing ink was employed. The temperature changes were detected by an infrared thermometer. By using a Tesla meter (fluxgate magnetometer), the corresponding remanence of the coatings and the printings was controlled. This allows to differentiated simple ferrite systems that are not nanoscaled.

Application/Economic benefits

A calculation of the financial benefit is difficult to estimate because of the universal applicability. The damage due to product and brand piracy are currently in Europe estimated at € 35 billion (Ernst & Young). Apart from averting the loss of revenue provides protection also benefits the developed product on the field of reputation damage, loss of market share to illegal competitors as well as to minimize the costs of the seizure and prevent counterfeiting. The financial benefit is oriented so depending on the product to be protected. In the low-budget range is naturally less than for the benefit of high-end products. Examples here could be exclusive or expensive perfumes and drugs with building materials such as Cement are compared.

The aim of the project proposed works on the development of a technologically sophisticated product protection. With this, valuable items such as expensive brand perfumes, car spare parts or pharmaceutical products provided and be suitably protected against illegal copying. The target clientele is here next match brands the packaging and printing industries.

Period of time: 01.05.2011 – 30.04.2013

Remarks

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