IL-11 SURFACE TREATMENT OF LIGNOCELLULOSIC MATERIALS WITH DIELECTRIC BARRIER DISCHARGE IN CONFIGURATION WITH FLOATING ELECTRODE

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Lignocellulosic materials can be treated with various techniques and processes to activate their surfaces and improve their ability to be coated or bonded. A novel device for generating a non-thermal dielectric barrier discharge in a floating electrode configuration has been developed for the pre-treatment of solid wood and other lignocellulosic materials. The contribution presents the influence of various parameters of the plasma treatment process on the properties of the treated surfaces and their interactions with the applied water-based coating and adhesives. It was found that the properties of the generated plasma discharges depend on the inherent properties of the substrates and the set treatment parameters. Treatment of fresh and aged or weathered wood surfaces with plasma leads to their oxidation. This also leads to increased surface free energy of the wood surface, its improved hydrophilicity and wettability with coatings and adhesives. The improved adhesion of water-based coatings and adhesives were obtained after treatment of natural wood, thermally modified wood, medium-density fibreboard and particleboard. The studies have shown that this type of pre-treatment is a good alternative to conventional surface treatment processes.

IL-12 BIOELECTRONIC INTERFACES BY PVD OF SEMICONDUCTING ORGANIC PIGMENTS

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Effective and localized, minimally invasive, and physiologically stable wireless electro-stimulation capability would present a valuable tool both in research, as well as in the development of bioelectronic therapies, neural prostheses such as artificial retinas, artificial limbs, auditory prostheses, and brain-machine interfaces. High quality thin films of semiconducting organic pigments can easily be deposited by thermal vacuum evaporation. Such films have shown excellent stability in aqueous environment, either in form of single thin films or as a part of functional devices, such as transistors and photodiodes. We will discuss a family of self-contained photo-capacitive devices for effective wireless bioelectronic stimulation based on a bilayer of organic pigments, metal-free phtylocyanine (H_2PC) and N,N'-dimethyl perylenetetracarboxylic diimide (PTCDI) as the active materials - organic electrolytic photocapacitors (OEPC). OEPC devices have demonstrated effective, chronic and localized in-vivo wireless peripheral nerve electric stimulation[1]. We will show how spatial structuring of the OEPC's affects their optoelectronic[2] and bioelectronic properties, demonstrated by the results of the

FEM numerical modelling and measurements of spatial transductive extracellular electric potential field maps.

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IL-13 IRREVERSIBLE THERMOCHROMICS AND THE NEED OF VACUUM-RELATED TECHNOLOGIES

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Most commercial thermochromic materials change colour reversibly and are commonly used for commercial and decorative purposes. More interesting applications are possible when the colour change occurs only once and remains practically permanent. Such materials can be used as temperature indicators to show whether the temperature of objects has reached a target value. Such applications are among the challenges in technology and are also important in everyday life. Some goods need to be stored below a certain temperature to protect them from spoilage, while others need to be heated properly to develop the desired properties. The solution is not straightforward, as the options for controlling the surface temperature of items are limited and/or unsustainable.

Our aim is to develop thermochromic inks and use them for printing labels that can be used as temperature indicators. Purely organic, thermochromically active materials are being developed that change colour at a desired temperature, somewhere in the wide temperature range. Reversible and irreversible versions are possible. The irreversible versions are our innovation and are shown here.

Unique thermochromic materials are used as an active ingredient in printing inks. To be as environmentally friendly as possible, no hazardous substances are used and the inks are water-based (without VOC). This goal brings many challenges, especially because the special thermal properties of the ink have to be considered. Most of these are related to the requirements of the printing industry,