

NEW BUSINESS ENABLED BY ADVANCED MATERIALS

Dr. Michael Heckmeier, Merck KGaA

In this presentation we want to give an overview about our activities in the field of advanced materials, which we consider as enabler for new business.

From a business perspective it is important to understand, that the customer or end-user does not care at all, whether a new product is based on an effect in the nano-, micro- or any different length scale. Important is performance and added value, but not underlying technology details.

Inorganic materials play an important role as performance enhancer in existing and newly emerging products. We highlight some research and development examples in the fields of coatings and optics.

Inorganic materials on carrier substrates provide the basis for interference pigments, which will be introduced briefly. While the major focus here will be colour effects also the functional application for heat reflection will be shown.

Based on a core-shell particle concept we present a method that provides large-scale photonic crystal foils. Unique colour effects are generated for decorative and functional applications.

Size adjusted ZnO particles provide after surface modification and the unique property of optimal UV absorption in combination with full transparency in the visible wavelength range and long-term stability.

A mono-layer anti-reflex coating for photovoltaics applications on the basis of SiO₂ sol-gel is presented, which significantly improves the efficiency of solar cells.

Our activities in the development of new organic materials will be presented, comprising mainly materials for Organic Light Emitting Diodes (OLED) and materials for Organic Electronics (OE).

Our OLED developments will be introduced. Specifically the polymer development will be highlighted. Based on polymers for red green and blue emission, we will introduce the concept of polymers for white emission.

Materials for OE are developed for future applications. We will introduce the background of OE from a business perspective and show, how we approach such emerging markets with new materials developments. The current performance status of our semi-conducting polymers will be presented.