

Optical coatings for increased functionality of microsystem devices

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In this presentation we will cover the field of coatings, that are specifically designed to tune the optical properties or bring novel optical functionalities to a large range of microsystem devices. Microsystems include a large variety of devices and applications such as MEMS, watch components, opto-electronic devices or sensors. We will first show how coatings can be structured to modify the aesthetic of these components. This approach known as structural colors can generate different coloring effects such as iridescent or color invariance depending on rotation angles. This approach is an alternative to classical coloration routes based on the use of dyes or pigments. Beyond a simple modification of color, we will show that the integration of specific dyes into coatings can be used to increase the efficacy and functionality of optoelectronic devices. The integration of specific fluorescent dyes can also be used to generate sensing layer. These layers can then be integrated into an optical detector equipped with a specific read-out system. The specialty of CSEM is mostly the development of specific matrices, often based on sol-gel chemistry, that are specifically designed to further increase the efficacy of this sensing layer by controlling surface area and porosity. This will be demonstrated for oxygen optical sensing, with application to environmental monitoring into water. Finally, the protection of optical sensors through the development of protective hydrophobic/oleophobic coating will be addressed as well.