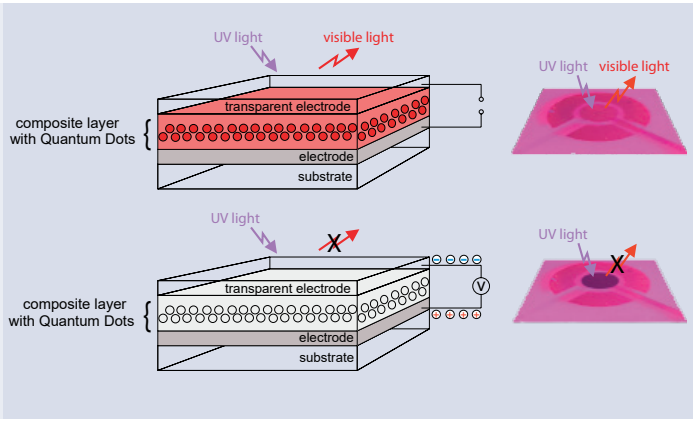
ELECTRO-OPTICAL TRANSDUCER BASED ON QUANTUM DOTS



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Principle description

Optical information is a central component for acting in daily life. Therefore, electro-optical transducers offer a wide range of applications for event- and condition monitoring. These transducers based on Quantum Dots detect and store temporarily electrical information without further energy consumption and provide them as an optical information for a certain time. By using an additional force sensitive device, the stored optical information can be used as an indicator of the condition or acted mechanical load on lighweight component. A sensor film based on Quantum Dots, developed by Fraunhofer ENAS in cooperation with the Center for Microtechnologies of the Chemnitz University of Technology, offers the basis for such transducers. In the initial state, UV light is transformed into visible light with a certain initial light intensity (photoluminescence). The transformation process of photoluminescence is prevented by injection of electrical charge carriers into the Quantum Dots via the system of electrodes. As result, the intensity of the visible light is reduced scalable depending on the injected amount of charge carriers.

Manufacturing technologies

- Thermal evaporation
- Spin coating
- Inkjet printing (DOD)

Application fields

- Mechanical load detection
- Electro-optical transducer (electromagnetic compatibility, visualization of electrical and magnetic fields)
- Protection against plagiarism, guarantee label
- Passive Display

Parameter

	typical	unit
Thickness (system of electrodes + nano composites)	250 – 300	nm
Storage time of charge carriers	> 60	h
Electrical charge (for 60 % of the initial light intensity)	< 50	nC/mm²
Response time	< 1	ms

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