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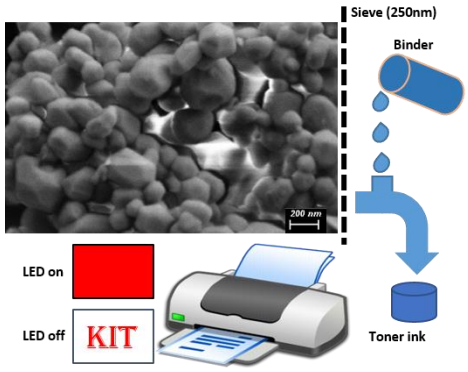
Master's Project – Title:

"Development and characterization of afterglow-based time-dynamic encoded inks for anti-counterfeiting."

Motivation

In the recent past, fakes have created a serious problem economically for institutions, manufactures, and governments. Due to this challenge, there is need for developing advanced anti-counterfeiting techniques, as a means of safeguarding the authenticity of original products. To this end, there have been several techniques such as the use of QR codes, luminous materials (colour tuning and holograms) and invisible inks. However, the fakes still catch up with these techniques and duplicate them, hence the need for continuous development and tricking of new ant-counterfeiting techniques. We therefore seek to develop new techniques utilizing both colour tuning and afterglow mechanism to come up with hard-to-mimic inks for the next generation anti-counterfeiting approaches.

Task



Development of afterglow-dynamic inks

The "Nanophotonics for Energy" division was established at KIT 2014 within the Institute of Microstructure Technology (IMT) and the Light Technology Institute (LTI). We have access to all of the state-of-the art research facilities within the National Research Centre of the Helmholtz Association.

We are currently looking for a Master student to expand our R&D capabilities within the area of advanced optical material applications. The research will be conducted within the group 'Advanced materials and Optical Spectroscopy' in the IMT. The work includes:

1. Sieving of submicron phosphor particles and characterizing with Scanning Electron Microscope.
2. Development and analysis of phosphor inks through mixing the phosphor particles with binders. This is a highly experimental step in which the physical and rheological studies are performed to optimize the ink.
3. Testing the optimized inks using a Dimatix Materials Printer (DMP-2850) and optical characterization of the prints.

Requirements

a. Interest to learn and develop optical-based anti-counterfeiting materials.
b. The candidate should be self-motivated, independent, and responsible with strong research affinity.
c. Knowledge of MATLAB programming would be an added advantage.

Forschungsabteilung
"Nanophotonics for Energy" division of IMT / LTI

Forschungsbereich
Advanced optical material applications

Ausrichtung
Experimental

Studiengang
Electrical Engineering / Material Science / Physics

Einstieg
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