Solid-State Fluorescent Calibration Structures

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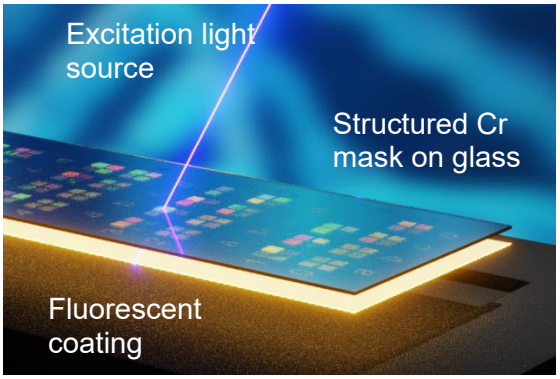
Fluorescence microscopy and fluorescent pattern recognition are fields with a wide range of applications in life sciences and diagnostics. Today's high-end instruments often require the use of calibration targets for reproducible x/y/z positioning and sensitivity. This is typically achieved using reservoirs of fluorescent liquids, doped specialty glass or colored beads.
Based on extensive experience in this field and building on its current portfolio of sub-micron patterning processes, IMT has developed cost-effective solutions to meet specific customer requirements for photoluminescent patterns on glass.

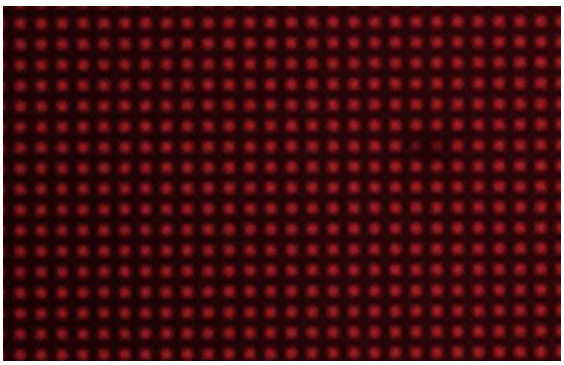


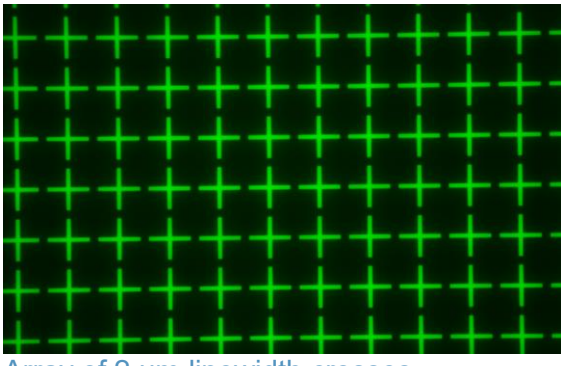
Schematic of a solid-state fluorescent target

In collaboration with the Swiss Federal Laboratories for Materials Science and Technology (Empa), broadband photo-luminescent coatings have been developed and optimized for use in various application scenarios. These include plasma-deposited inorganic thin-film coatings with high resistance to radiative degradation for high-power illumination, as well as bright photoluminescent - but less robust - organic-based coatings. The susceptibility of the coatings to bleaching has been further reduced by applying additional layers of heat dissipating material.


Fluorescent target prototype (λ_{exc}=405 nm)

All layer types were successfully prototyped and characterized on sub-micron patterned demonstrator targets. The processes for depositing photoluminescent layers as well as the nanopatterning processes have been optimized for coating arbitrary and large area structures.


Array of square 350 nm dots, λ_{exc}=560nm / λ_{em}=620nm (Nikon Ts2R FM)


Array of 2 µm linewidth crosses λ_{exc}=470nm / λ_{em}=530nm (Nikon Ts2R FM)

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PRECISION ON GLASS

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