Luminescent coatings microstructured by nanoprinting

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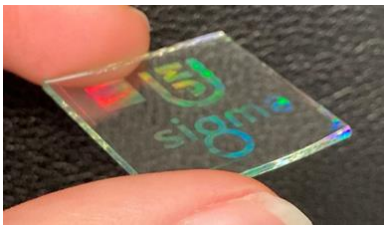
The fight against counterfeiting is very expensive for the global economy, and today all sectors of activity have to use marking and traceably technology to conform to regulatory requirements or respect good practices. A number of technologies exist, with varying costs or levels of security [1]. Even though these technologies are increasingly sophisticated, it is necessary to develop fast and cost-effective solutions with a higher security level.

Sol-gel based layers doped with phosphors were directly microstructured to produce sub-lambda 2D gratings, using nanoimprint lithography. Such an approach enables the simplification of technological processes, since no further etching process is required, which reduces considerably the number of technological steps and thus production costs. Surface microstructuring (see figure) improved fluorophore emission in the visible range. Demonstrations were performed experimentally and samples were characterized using angle-resolved fluorescence. The measured emission intensities on microstructured luminescent coatings were 3 to 4 times higher, depending on the angle of observation, than those recorded on flat surfaces. This technological approach is very promising for the next generation of low-cost, high-performance anti-counterfeiting marking processes and for the traceability of objects based on unique optical effects.



Design combining a luminescent coating and a diffraction grating

References

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