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Ph.D. thesis (2024-2027)
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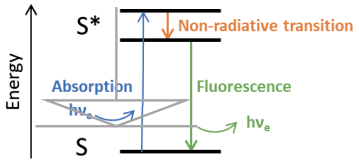
LUMNI – Luminescent nanoparticles design for the development of high-performance luminescent functional inks

Synthèse de nanoparticules luminescentes pour le développement d'encres fonctionnelles luminescentes hautes performances

FunPrint

Context

Fluorescence: unique property of emission of a lower energy photon after absorption



Usually:

$hv_a \neq hv_e$

UV → Visible

Growing demands for numerous applications:

- Anti-counterfeiting
- LED display
- LDS in PV

Need for simplified deposit: additive processes

Need for more sustainability: non-toxic components and processes

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In collaboration with **ICCF**: ICCF Institut de Chimie de Clermont-Ferrand

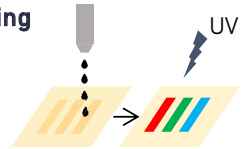
Objectives

Development of a high performance RGB sustainable luminescent ink

1. **Selection of luminescent particles**
   Efficient selection - Favor dispersion in targeted media

2. **Formulation of an ink**
   Control of the dispersion in different media (aqueous)

3. **Ink deposition / processing**
   Inkjet – Screen printing
   Interaction ink – process – substrate

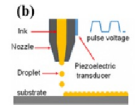


4. **Color management – applications:**
   Red / Green / Blue Fluid design

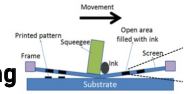
Methods

Fluid formulation:
Formulation and mixing
Rheology and physico chemistry properties

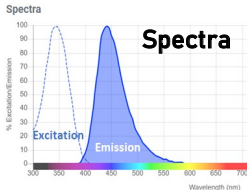
Processability:
Deposition processes
Surface and interface



Inkjet



Screen printing



Spectra

Optical characterization:
Excitation-Emission spectra/
Quantum Yield / Stability

Post-printing properties:
Time stability
Color management
Applications