Supporting Information

Digital Controlled Luminescent Emission *via* Patterned Deposition of Lanthanide Coordination Compounds

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Experimental details

$Ln(NO_3)_3.6H_2O$, Pyridine-2,6-dicarboxylic acid, dimethylamine solution, Olefin E1010 (acetylene glycol-based surfactant, produced by Nissin Chemical. Industry Co., Ltd), were used as received. Ultrapure water is used directly from a Milli-Q water system. Luminescent emission and excitation spectra were recorded on HORIBA Jobin-Yvon FluoroMax-4 spectrometer. with excitation and emission slit widths of 1/1 nm at 298±2 K. The powder X-ray diffraction (XRD) patterns were recorded on crushed single crystals in the 2θ range 5–50º using Cu-Kα radiation on a PAN analytical X'pert PRO X-Ray Diffractometer. Surface X-ray diffraction (SXRD) patterns of the films were collected on a Panalytical X'pert Pro MPD diffractometer using graphite-monchromated Co Kα radiation in the 2θ range of 5−50° with a step size of 0.02°. The scanning electron microscopy (SEM) measurement was carried out on a JEOL JSM-6700F instrument. For the inkjet printing, an off-the-shelf EPSON STULUS PHOTO R270 printer was used with a resolution of 5760×1440dpi. The hydrophilicity of all the membrane surfaces was characterized using a contact angle goniometer (OCA20, Data physics, Germany).

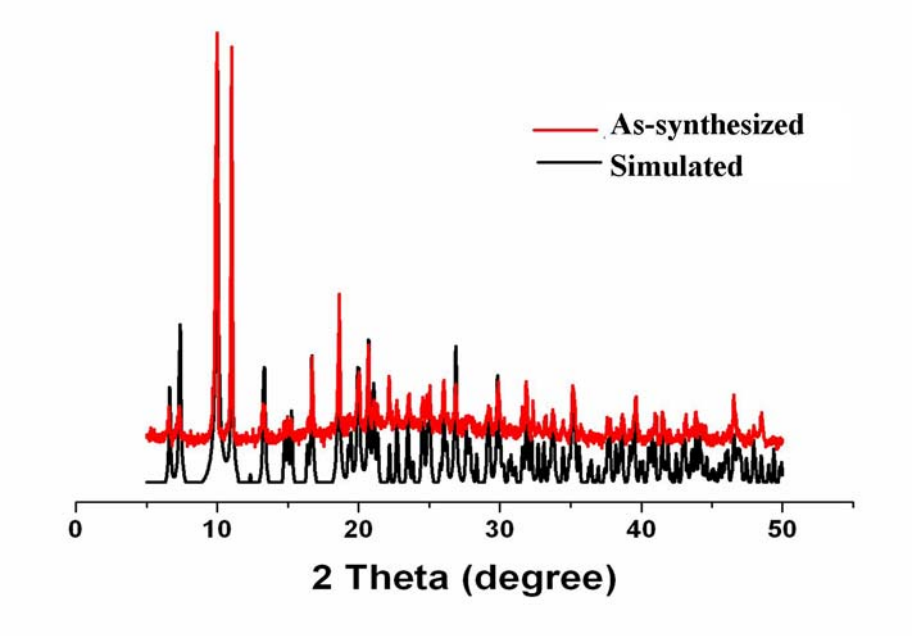

Figure S1. XRPD pattern for the as-synthesized sample and the simulated pattern from single-crystal X-ray data of **1.**

Figure S2. EPSON STYLUS PHOTO R270 printer and ink cartridge filled with precursor solutions.

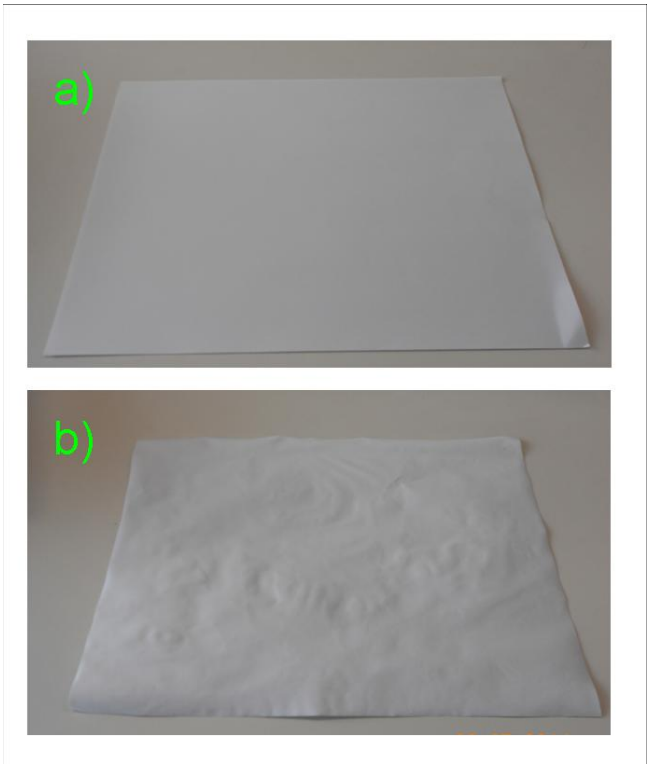

Figure S3. Original A4 paper (a) and printed LCCs paper for 8 cycles (b).

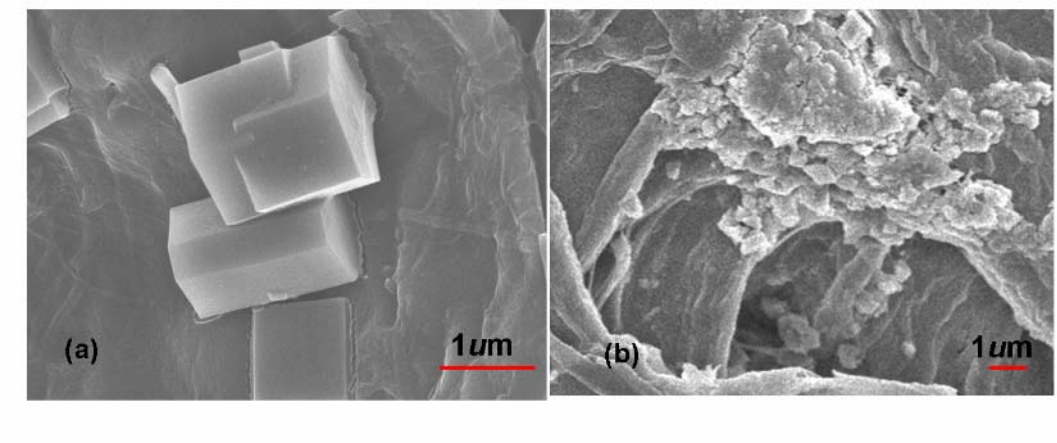

Figure S4. (a) Well-shaped crystals of compound **1** were grown in the contact areas of the paper substrate. (b) After breaking crystals by grinding, the samples still can adhere to the surface of paper.

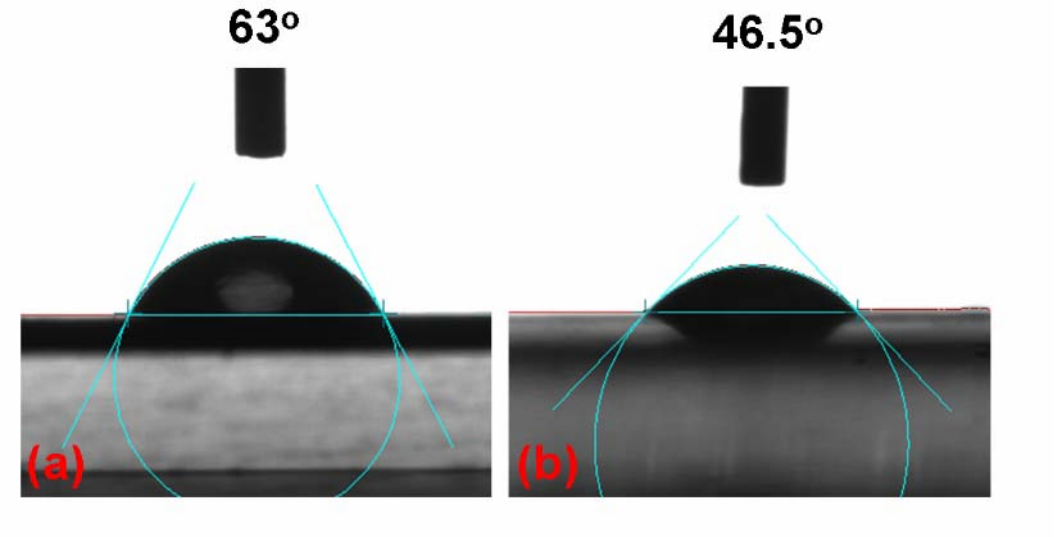

Figure S5. (a) Contact angles between the plastic and precursor solution; (b) contact angles between paper substrate and precursor solution.

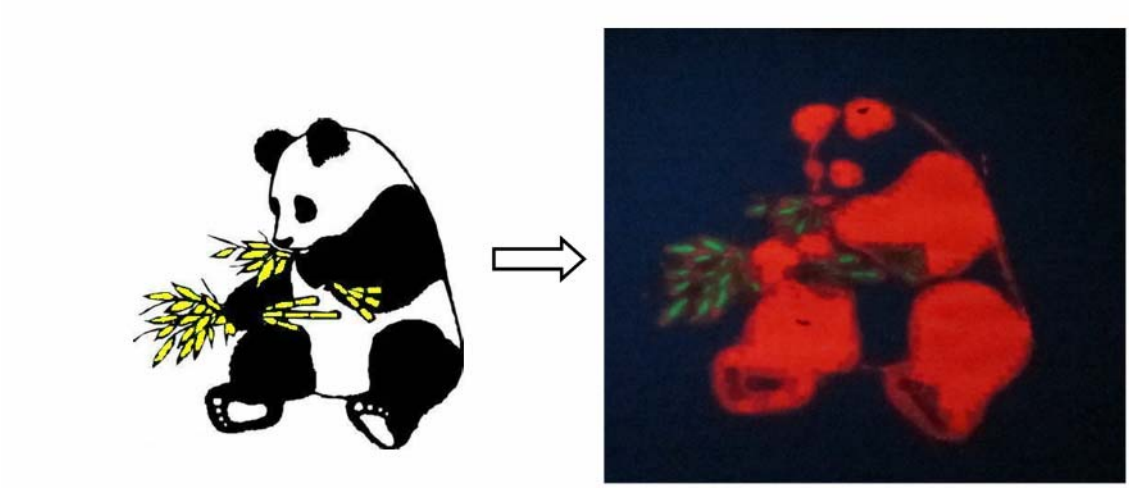

Figure S6. Original picture and surface view of a printing sample under illumination of UV light. Red and green emission designated as ‘blank and yellow ink cartridge’ by the Epson coding

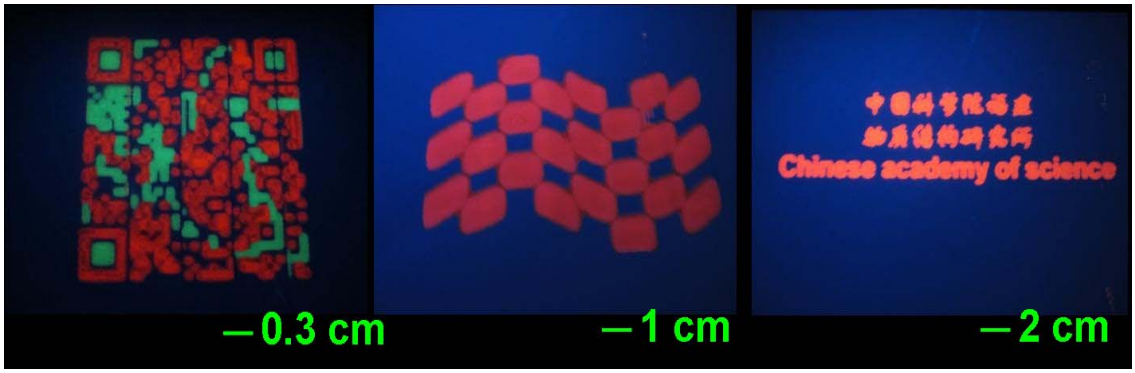

Figure S7. Printed LCCs samples with high resolution in varied sizes under excitation of UV light.