Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

SUPPLEMENTARY INFORMATION

Photoacid catalyzed organic-inorganic hybrid inks for the manufacturing of Inkjet-Printed Photonic Devices

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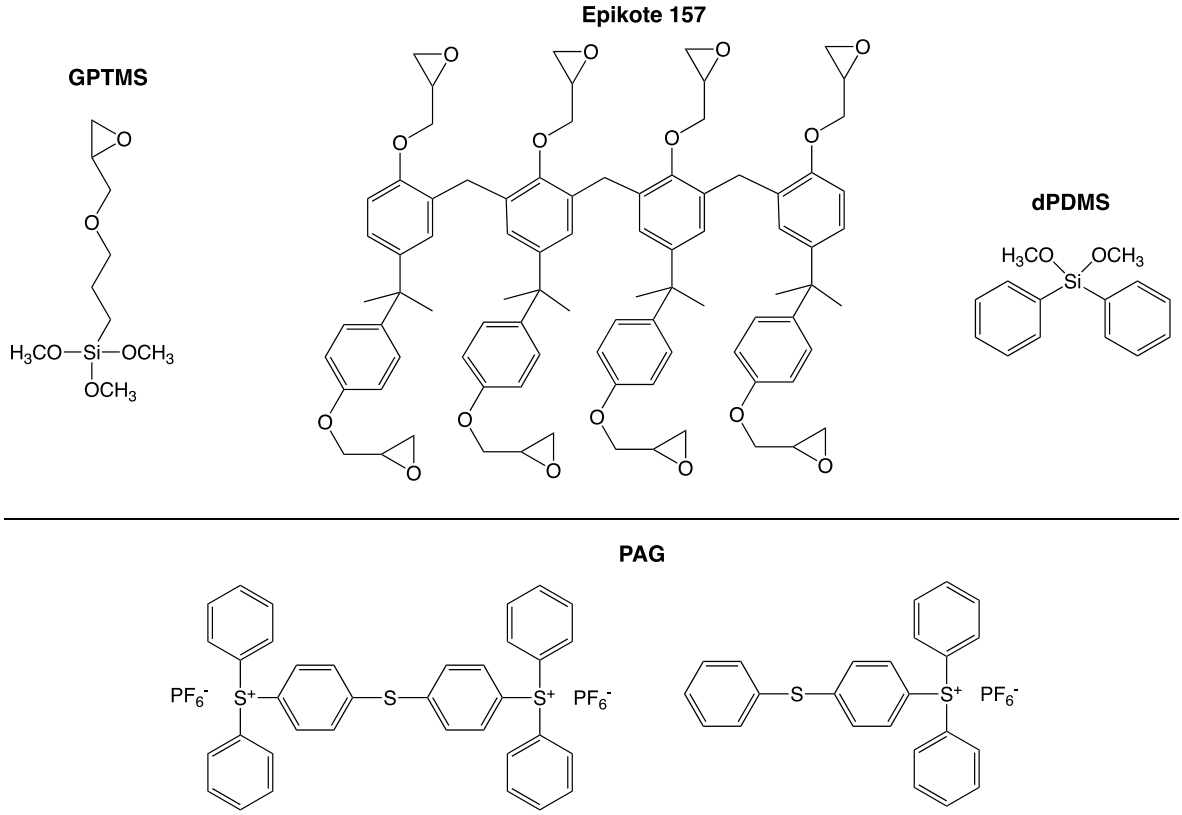
Supplementary figures



Scheme S1 Chemical structure of the main components of the inks. GPTMS (3-glycidoxypropyltrimethoxysilane), Epikote 157, dPDMS (Dimethoxydiphenylsilane) and PAG (triarylsulfonium hexafluorophosphate salts, 50% in propylene carbonate).

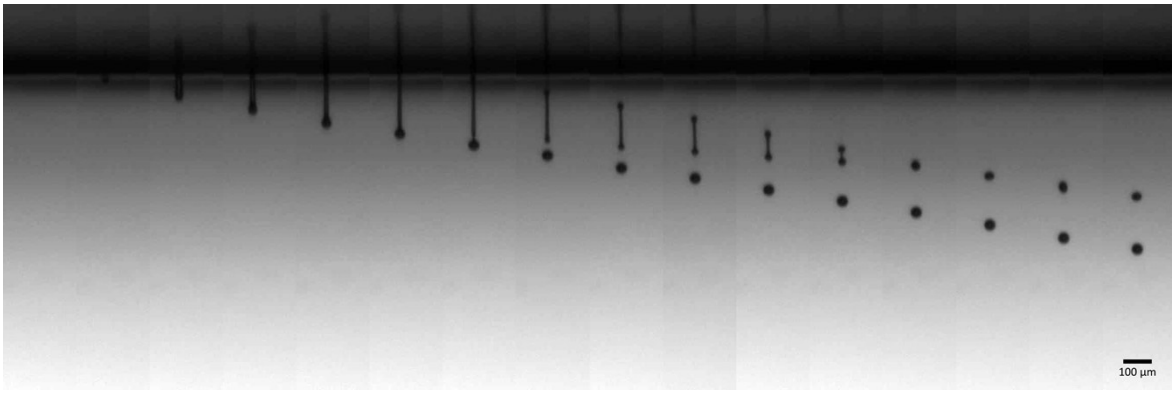


Fig. S1 Sequence of photographs (from left to right) showing the drop formation process for the Model ink under overvoltage conditions. Application of higher voltage to the printhead led to a longer jet that ends up breaking up in a main droplet travelling at higher speed and one or several satellites following the first one. The time interval between two adjacent frames is 11 µs (scale bar: 100 µm).

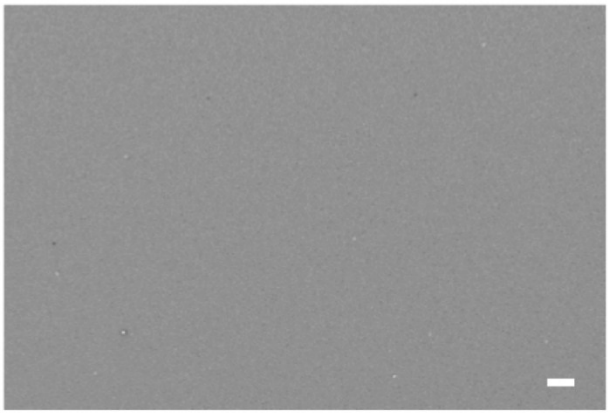


Fig. S2 SEM morphology of 3.5 µm thick cured film of Model ink (scale bar: 2 µm).

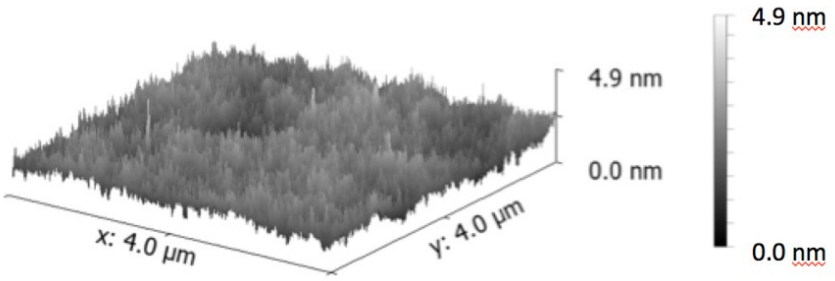


Fig. S3 AFM topography of a cured Model ink deposit (3.5 µm thick film).

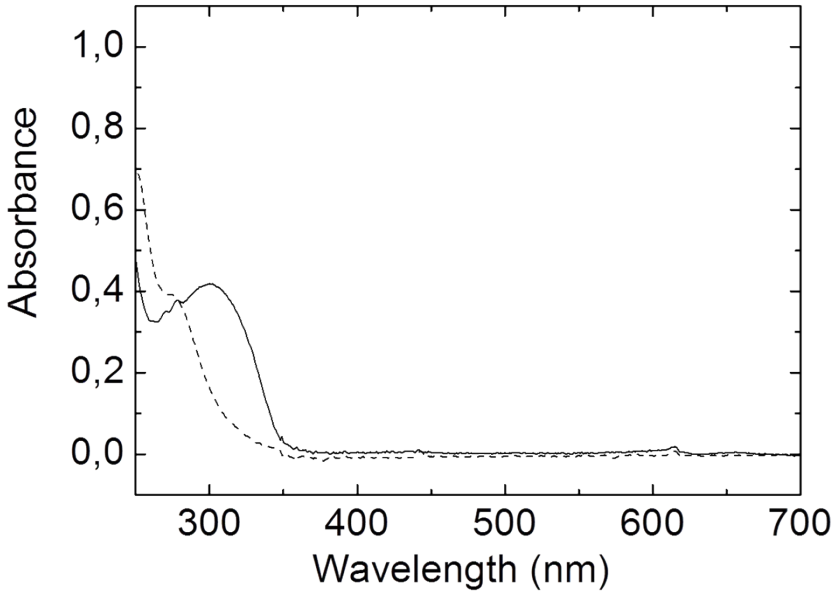


Fig. S4 UV-Vis absorption spectrum of thin films of the Model ink placed between quartz glass plates (10 μm gap) before (continuous line) and after UV irradiation (dashed line).

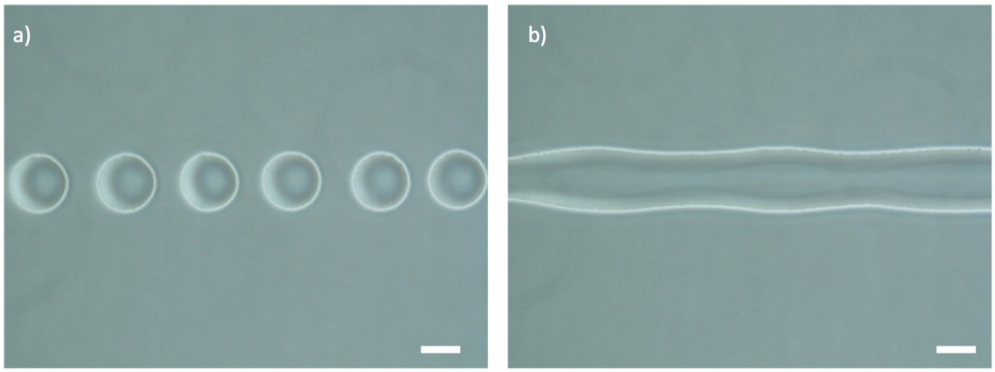


Fig. S5 Phase contrast microscope images of the inkjet printed drops of Model ink deposited along a line in ozone treated substrates at different dpi (scale bar: 100 μm): (a) 120 dpi and (b) 300 dpi. Bulging appears in this last case.

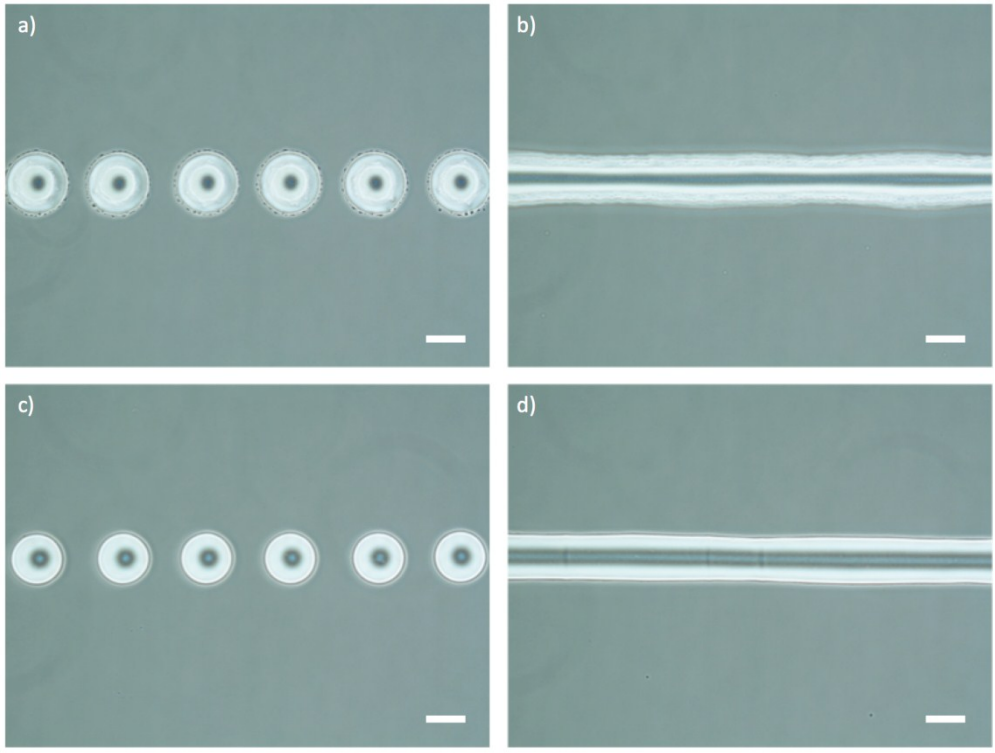


Fig. S6 Phase contrast images of inkjet printed drops of HRI ink deposited along a line in ozone treated substrates cured (a and b) in ambient atmospheric conditions and (c and d) under mild vacuum (100 mBar) (scale bar: 100 μm).

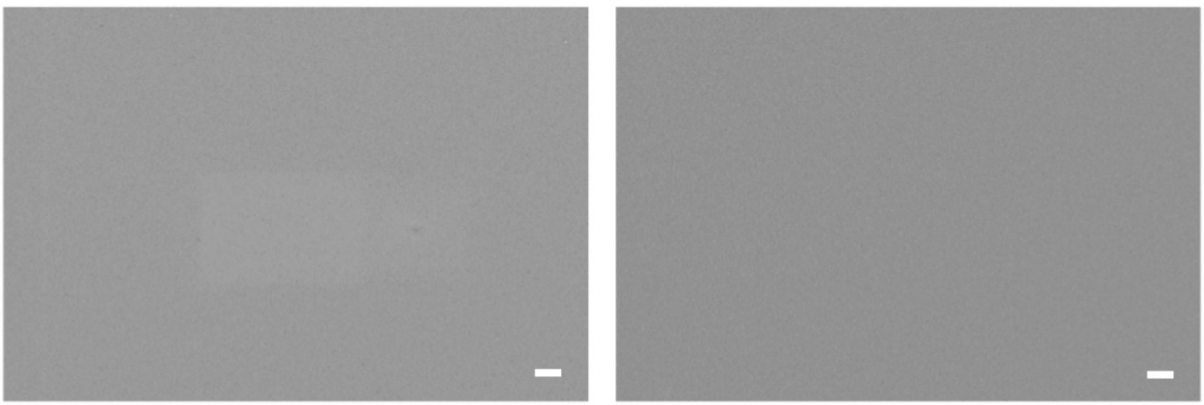


Fig S7 SEM morphology of 4 μm thick films of HRI ink cured (a) in ambient atmosphere conditions and (b) under mild vacuum (100 mBar) (scale bar: 2 μm).

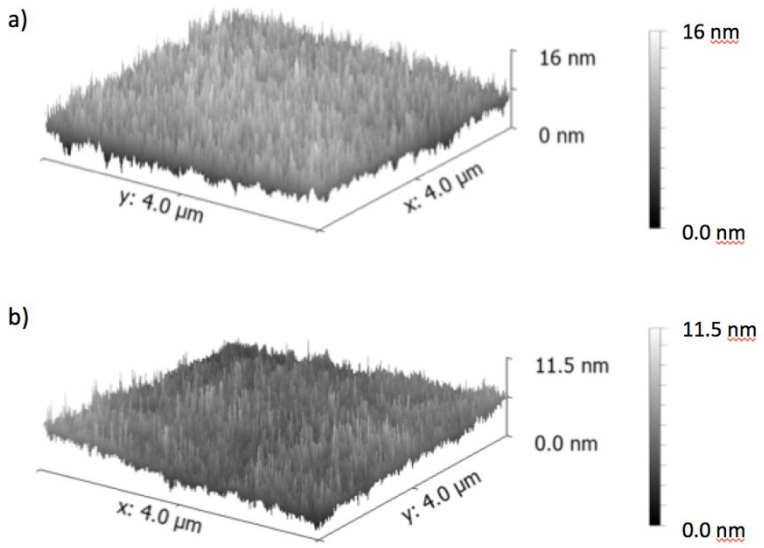


Fig. S8 AFM topography of HRI ink deposits (16 µm thick film) exposed (a) in ambient atmospheric conditions and (b) under mild vacuum.

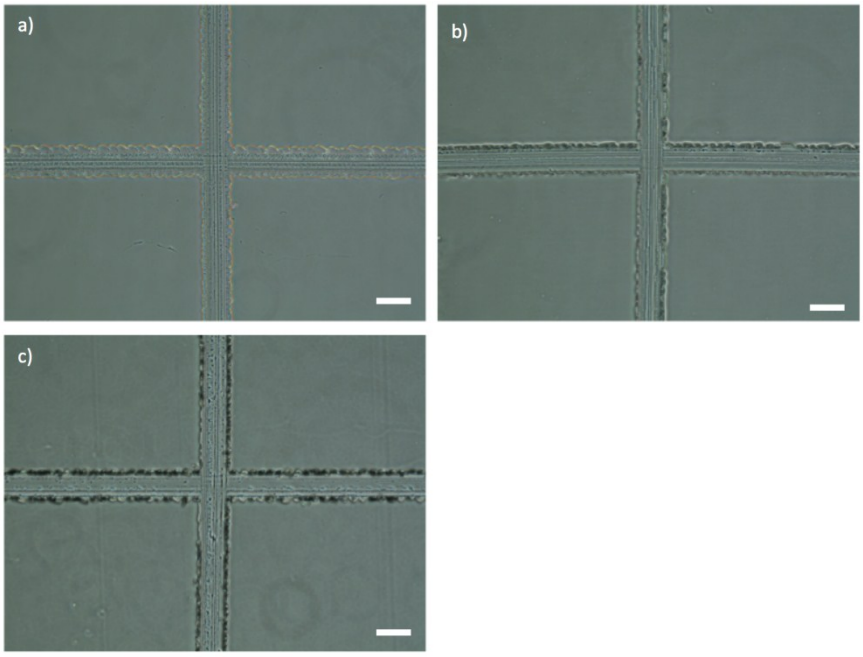


Fig. S9 Optical microscope images of cross-cut areas after the ASTM 3359 adhesion test for thin cured films deposited by inkjet. (a) Model ink film (thickness: 3.5 µm) and (b and c) HRI ink film (thickness: 4 µm) cured (b) in atmosphere and (c) under mild vacuum conditions.

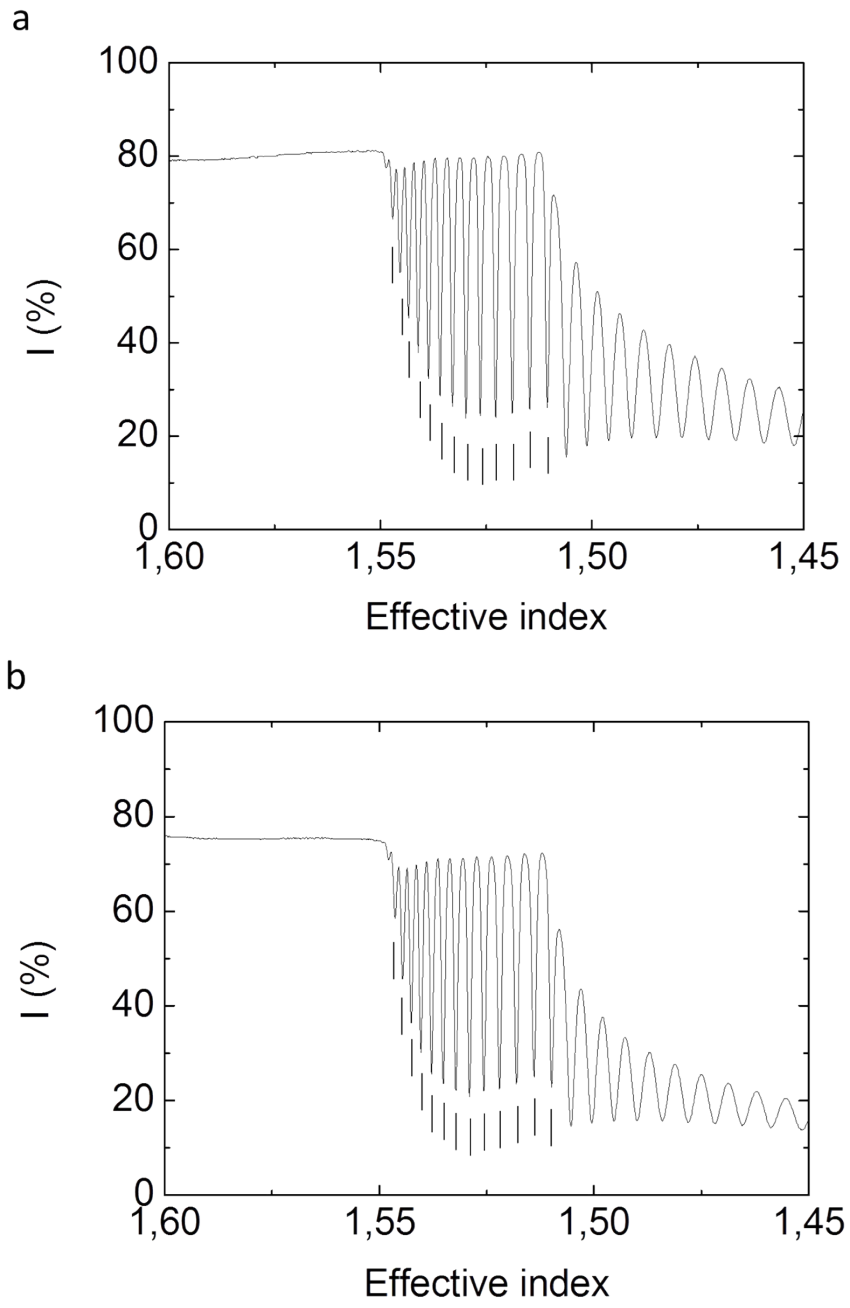


Fig. S10 (a) TE and (b) TM propagation modes (at 632.8 nm) for a HRI ink deposit (16 microns thick film) cured under mild vacuum conditions. Modes with effective refractive index higher than that of the substrate (n_g = 1.514), and fully supported by the inkjet printed film are indicated with a line.

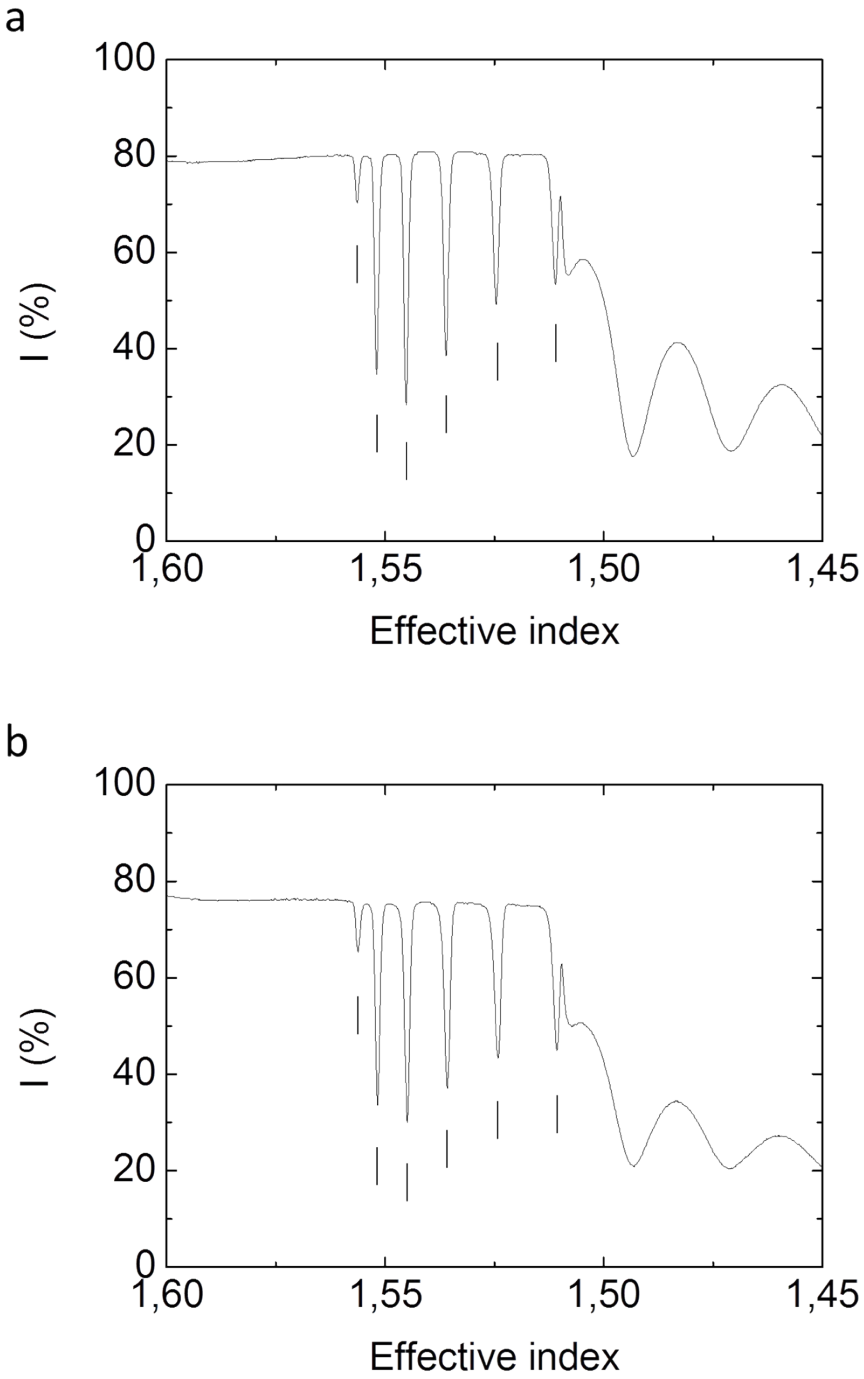


Fig. S11 (a) TE and (b) TM propagation modes (at 632.8 nm) for a HRI ink deposit cured in ambient atmosphere (4.4 μm thick film). Modes with effective refractive index higher than that of the substrate (n_g = 1.514), and fully supported by the inkjet printed film are indicated with a line.

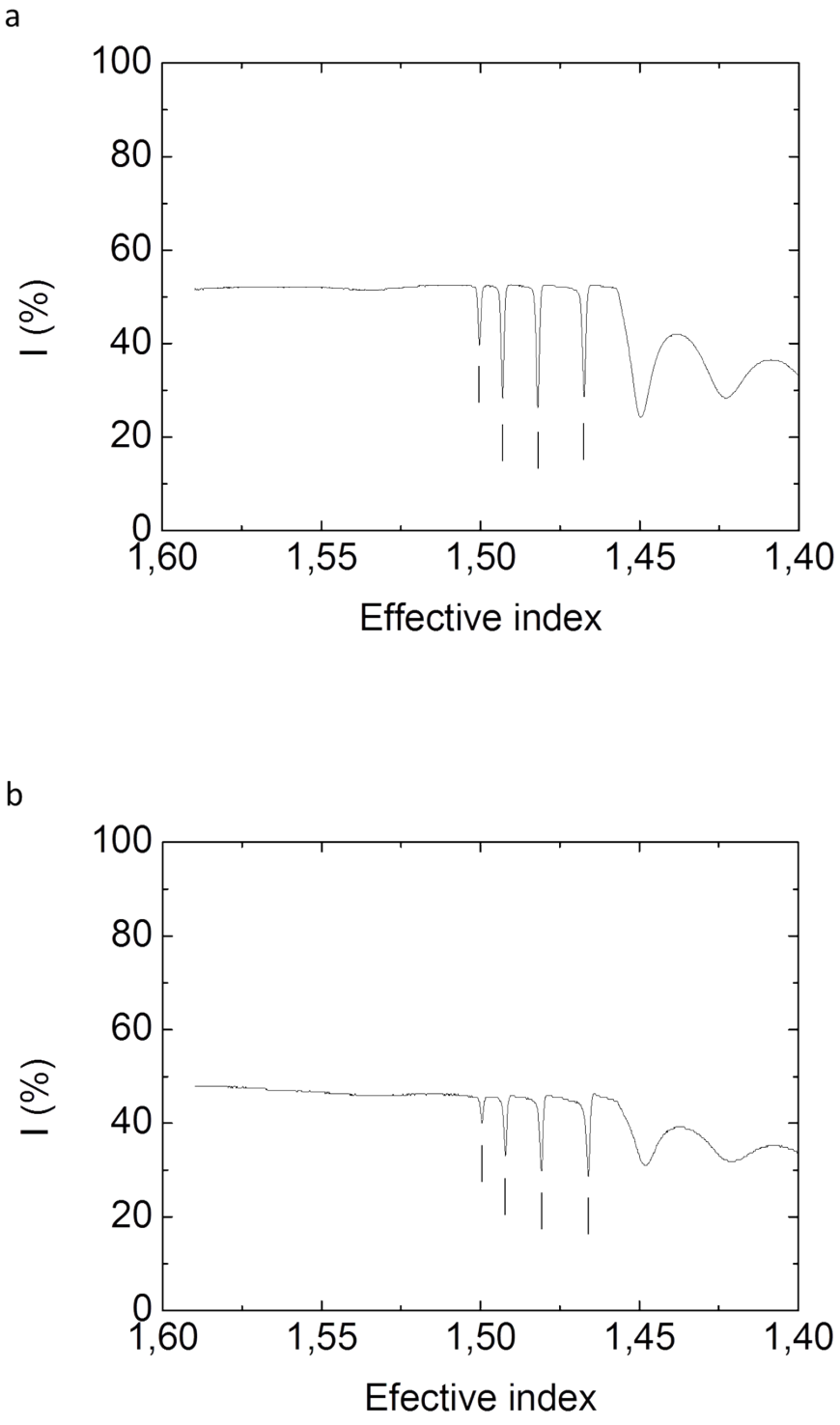


Fig. S12 (a) TE and (b) TM propagation modes (at 632.8 nm) for a Model ink deposit (3.4 μm thick film). Modes with effective refractive index higher than that of the substrate (n_q = 1.457), and fully supported by the inkjet printed film are indicated with a line.