**Fig. S1.** AFM image of the mark left by the blade to determine the PNIPAM film thickness. Insert a profile of the topography.

**Fig. S2.** FTIR spectra (4000-2200 cm\(^{-1}\)) of clear glass (solid line), MPTS modified glass (dotted line) and MPTES-PNIPAM glass (dashed line).

**Fig. S3.** UV-visible spectra of MPTS-PNIPAM on glass (dotted line) and MPTS-PNIPAM on glass loaded with RBPY (red full line).
Fig. S4 Graph of the ablation depth, measured by AFM, as a function of laser fluence.

Fig. S5 AFM image of the patterns obtained at two different fluences above the threshold fluence: A) 1.2 J/cm\(^2\) and B) 1.35 J/cm\(^2\).

Fig. S6 Optical micrographs of a square pattern produced by DLIP of a doped hydrogel. The pattern is produced using two successive pulses and rotating the sample 90° between pulses.
Fig.S7 Optical micrograph of a pattern produced by DLIP on a hydrogel doped with methylene blue.

Fig.S8 Optical micrograph of a pattern produced by DLIP on a poly(acrylamide-co-acrylic acid) hydrogel doped with RBPY.

Fig.S9 Optical micrographs of a pattern produced by DLIP on a poly(N-isopropylacrylamide-co-(2%) acrylamidopropanesulfonic acid) hydrogel doped with methylene blue.