

Supplementary material for:

**Effect of different physical cross-linkers on drug release from
hydrogel layers coated on magnetically steerable 3D printed
microdevices**

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Figure S1 depicts the visual appearance of a typical honey dipper, which inspired the design of the devices described in the main manuscript.



Figure S1. Honey dipper.

Figure S2 visually shows the dimensions of the devices. L corresponds to the length, D to the outer diameter, d to the inner diameter. a is the space between the disks, while b corresponds to the thickness of the disks.

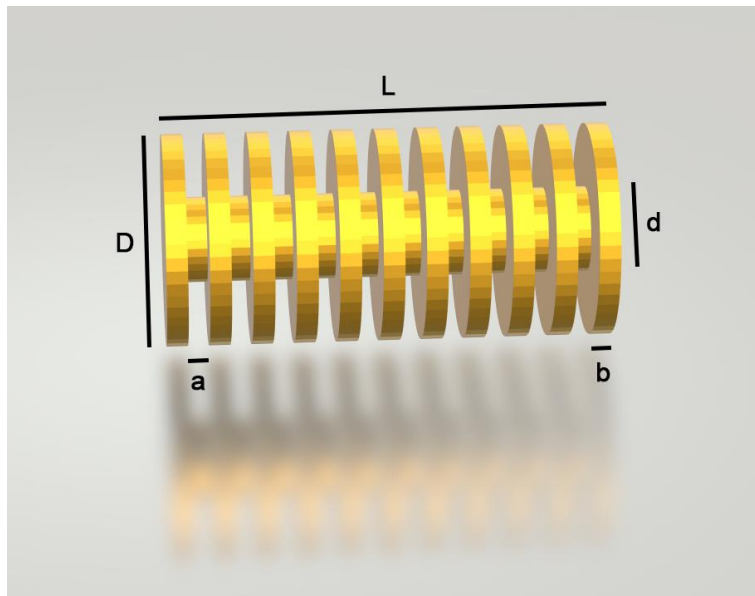


Figure S2. Dimensions of the devices

Figure S3 is a 10000 X SEM image of the surface of an as printed device.

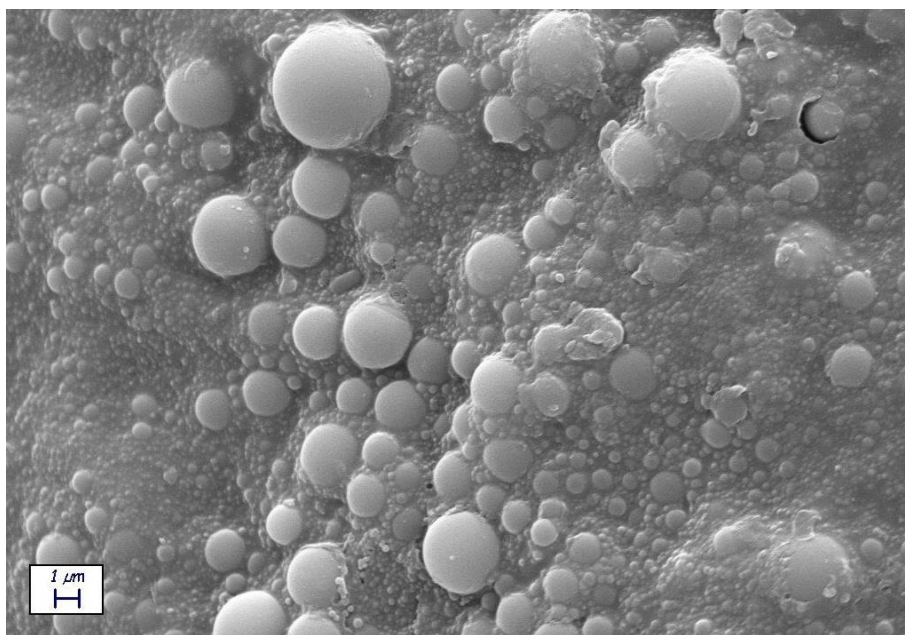


Figure S3. SEM image of an as printed device (10000 X).

Figure S4 depicts the section of a metallized device. The latter was inglobated in an epoxy resin, sectioned, polished and observed at the optical microscope.

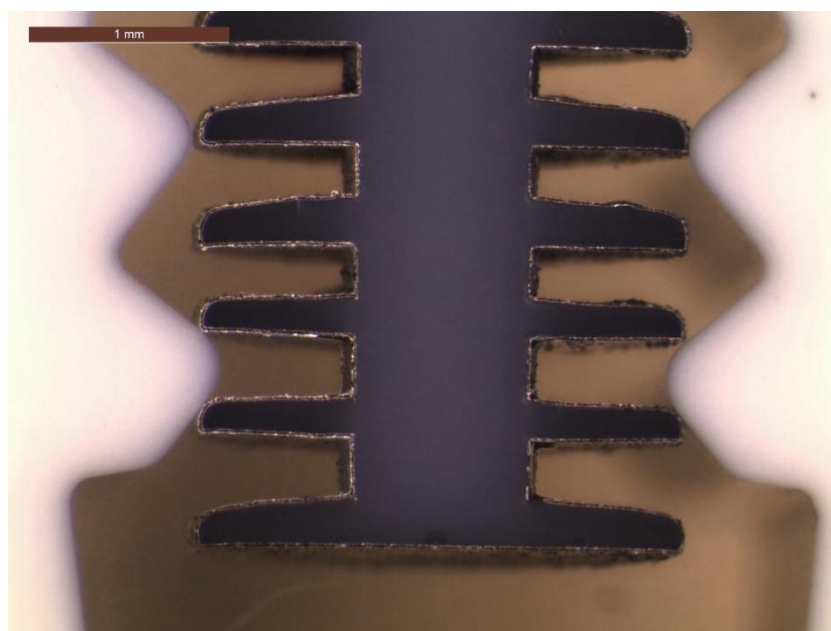


Figure S4. Section of a metallized device (optical microscope).

Table S1 reports the theoretical values of the dimensions visualized in figure S2. It also reports the experimental dimensions measured from the section visible in figure S4. Each experimental value is the result of five measures acquired from three different zones of the device. The ratio experimental/theoretical is reported as well for each dimension.

Table S1. Theoretical and experimental dimensions of the microdevices.

Dimension	Theoretical (μm)	Mean experimental (μm)	Standard deviation (μm)	Ratio on theoretical (%)
L	5250	5194.3	16.5	98.9
D	2500	2395.0	8.0	95.8
d	1000	845.7	26.9	84.6
a	250	351.3	45.1	140.5
b	250	153.3	16.1	61.3

Figure S5 is a 10000 X SEM image of the surface of a metallized device. Figure S6 reports the corresponding EDS profile.

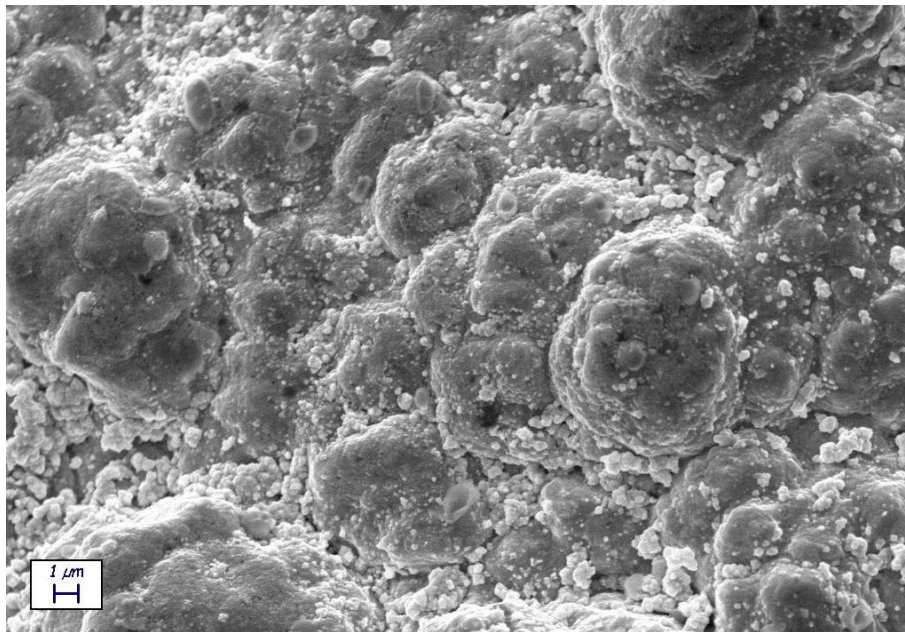


Figure S5. SEM image of a metallized device (10000 X).

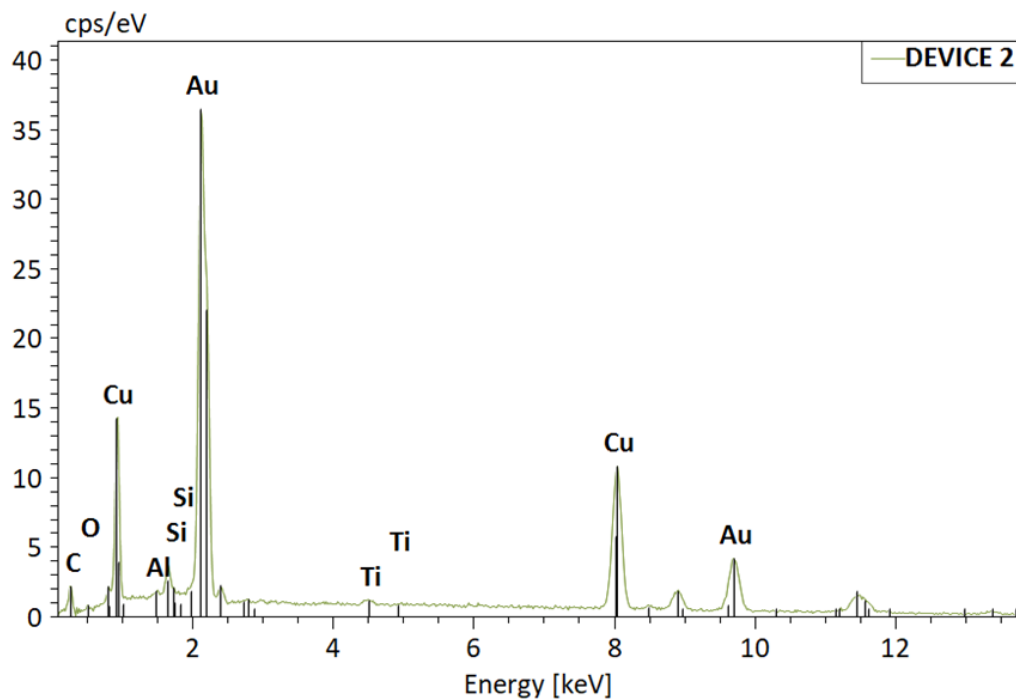


Figure S6. EDS analysis of the surface depicted in figure S5.

Figure S7 schematically depicts the coating process employed to load the hydrogel on the devices. Samples were suspended on a thin nylon wire inside a sample holder (visible in figure S8). Then, devices were first immersed in the alginate solution (figure S7 a) and then in the reticulating agent (figure S7 b). Finally, samples were removed from the holder.

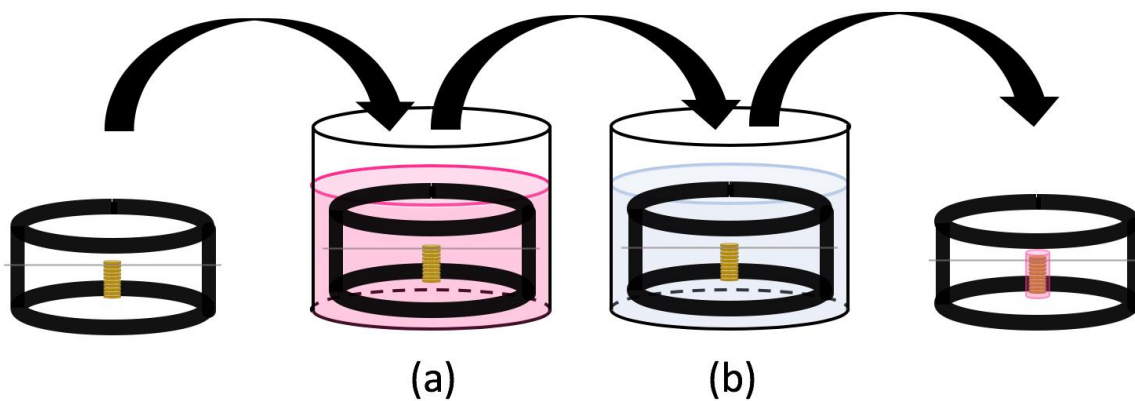


Figure S7. Hydrogel loading procedure.

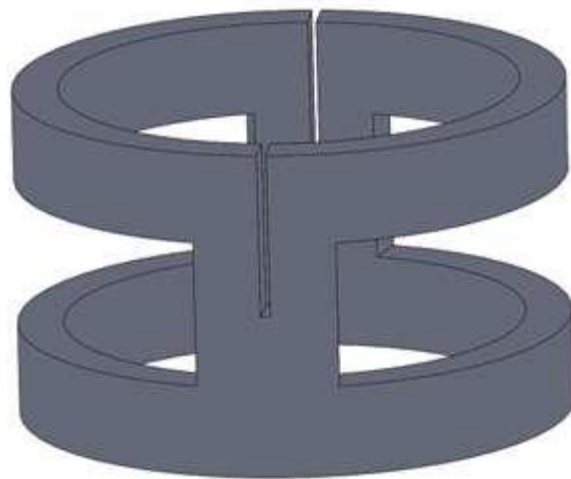


Figure S8. Sample holder.

Figure S9 shows the VSM analysis performed on a single uncoated device.

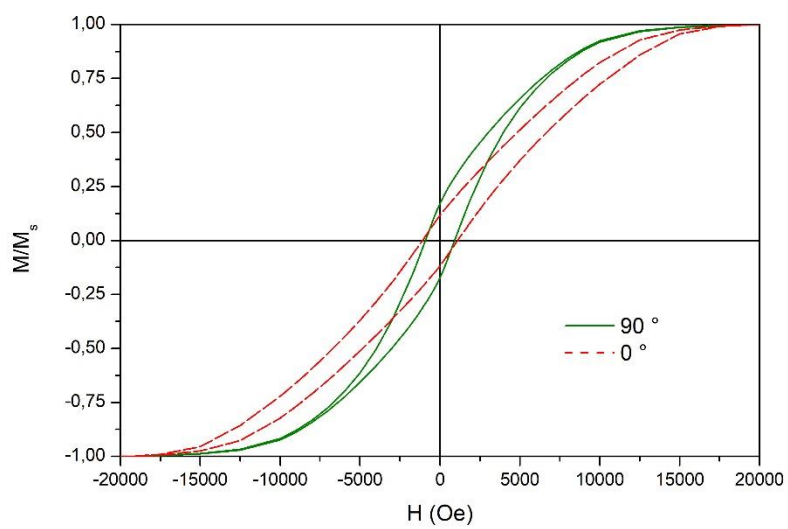


Figure S9. VSM of an uncoated device.