Supporting Information

Controlled poling of fully printed piezoelectric PVDF-TrFE device multifunctional platform with inkjet printed silver electrodes

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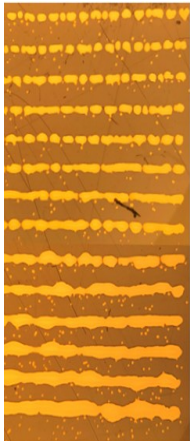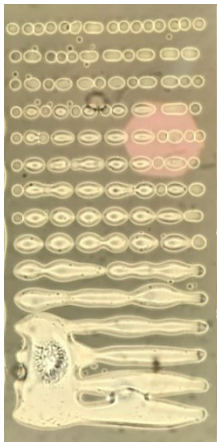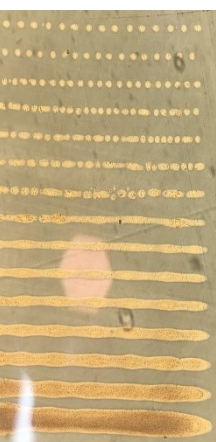
Table S1. Jetting parameters of the different inks.

	Ag ANP	Ag Inktec	Ag PVN	Au
Platen temperature [°C]	40	-	-	-
Cartridge temperature [°C]	35	38	39	30
Jetting frequency [kHz]	5	3	5	5
Meniscus Setpoint	5.0	2.0	5.0	5.0
Initial cleaning	None	SplitPurgueSplit	SplitPurgueSplit	SplitPurgueSplit
Printing cleaning	None	SplitPurgueSplit (50 Bands)	SplitPurgueSplit (70 Bands)	None
ΔV [V]	30	40	30	30
Drop spacing [µm]	40	35	40	15
Δt_1 [µs]	2.560	2.816	2.560	2.560
Δt_2 [µs]	2.560	3.712	2.560	2.560
Δt_3 [µs]	2.560	3.392	2.560	2.560
Δt_4 [µs]	-	0.832	-	-
Level V_1	7 %	20 %	7 %	7 %
Level V_2	100 %	100 %	100 %	100 %
Level V_3	27 %	67 %	27 %	100 %
Level V_4	-	40 %	-	-
Slew rate 1	1.00	0.65	1.00	1.00
Slew rate 2	1.00	0.93	1.00	1.00
Slew rate 3	1.00	0.60	1.00	1.00
Slew rate 4	-	0.80	-	-

Drop spacing selection and morphology for the bottom electrode

After stablishing the proper parameters of the ink ejection in the inkjet printer (Table S1) different lines were printed at different DS (Figure S1). The DS represents the center-to-center distance between the printed droplets from 5 to 75 µm, increasing 5 µm each, to check which is the one that presents a continuous line with the lower amount of ink. Then, to know the thickness of the continuous lines printed at each DS a profilometric analysis has been done. The images of the pattern of each ink and the profile of the continuous lines are shown in the Table S2. As can be seen, each ink presents different pattern in the PET surface, therefore the DS selected will be correlated with the different properties of the inks. Also, in Figures S1 and S2, can be observed that ANP and PVN Ag inks have bigger thickness in comparison with the Ag Inktec or the Au ink and it can be attributed to the wettability properties of the ink in the substrate, because the ones that wet less have a worst distribution of the, pilling up at one point instead of being homogeneously distributed. Analyzing all of this features, the DSs selected are: 40 µm, 40 µm, 35 µm and 20 µm for the ANP, PVN, Inktec and Au inks respectively.

Table S2. Drop spacing pattern of the different inks

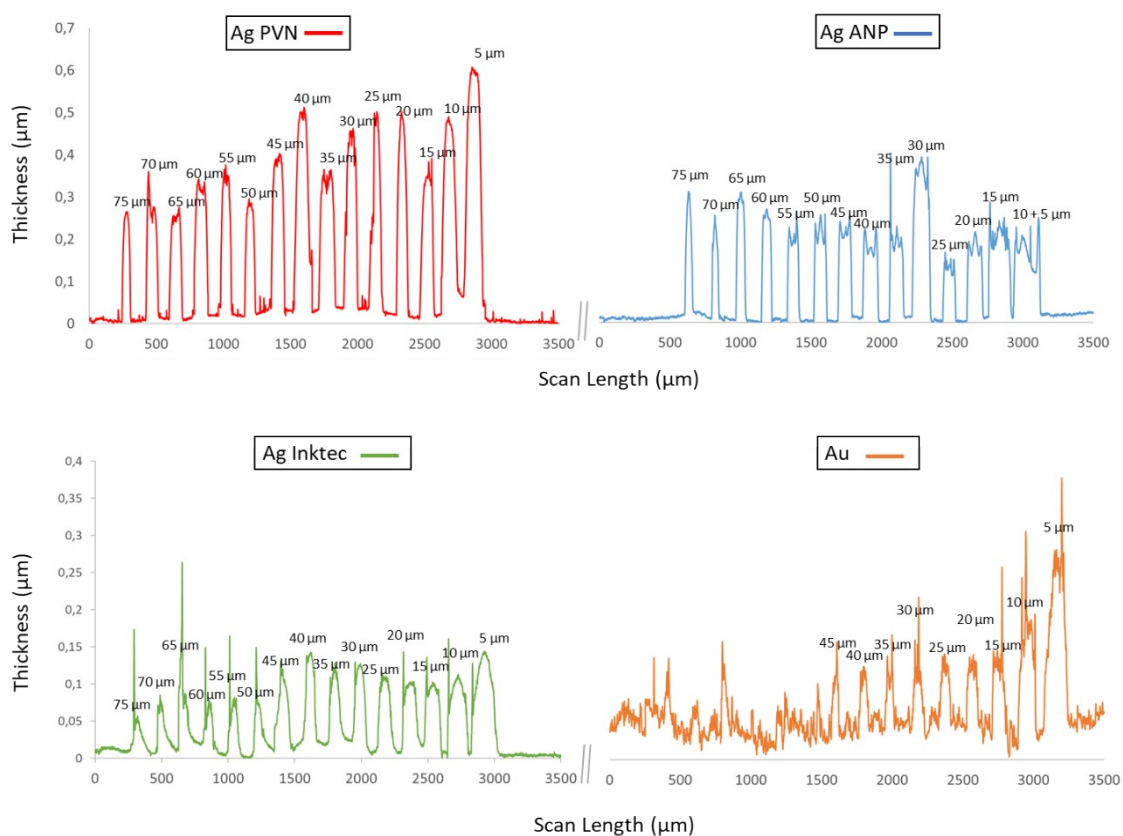| Design	PVN	ANP	Inktec	Au
	40	40	35	35

Figure S1. Profilometric analysis of the printed lines at different drop spacing

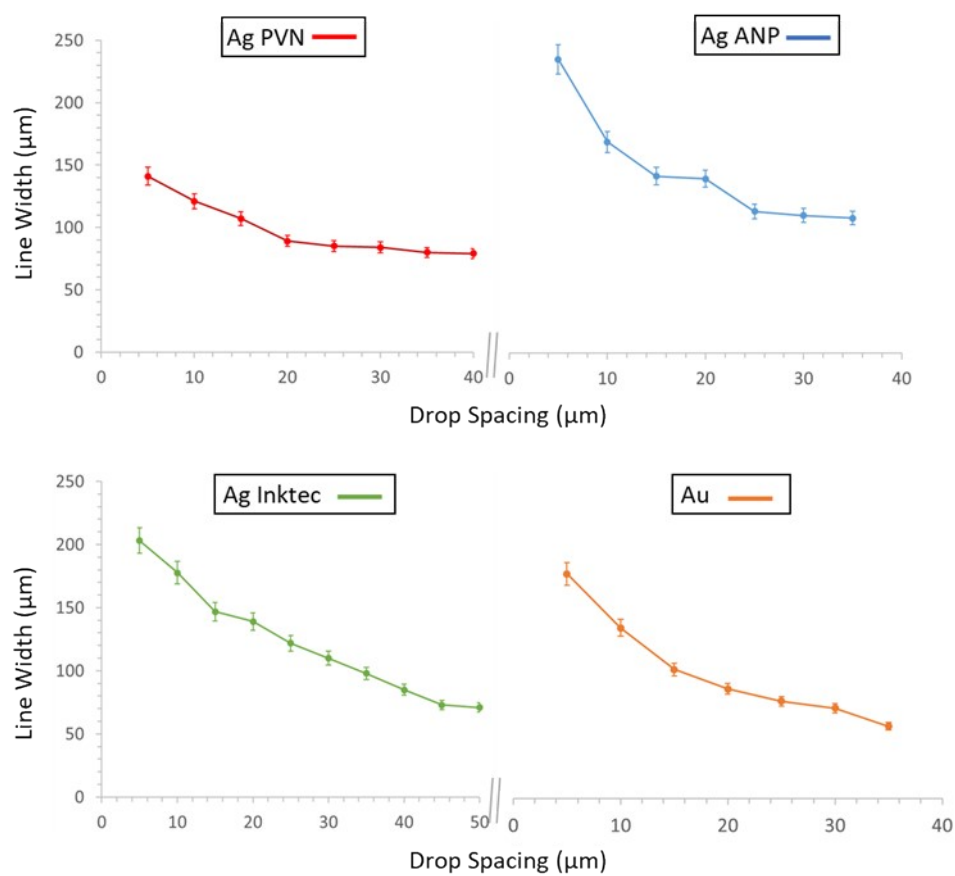**Figure S2.** Line width of each line printed at different drop spacing (n=3)

Table S3. SEM images of the different inks surface layers.

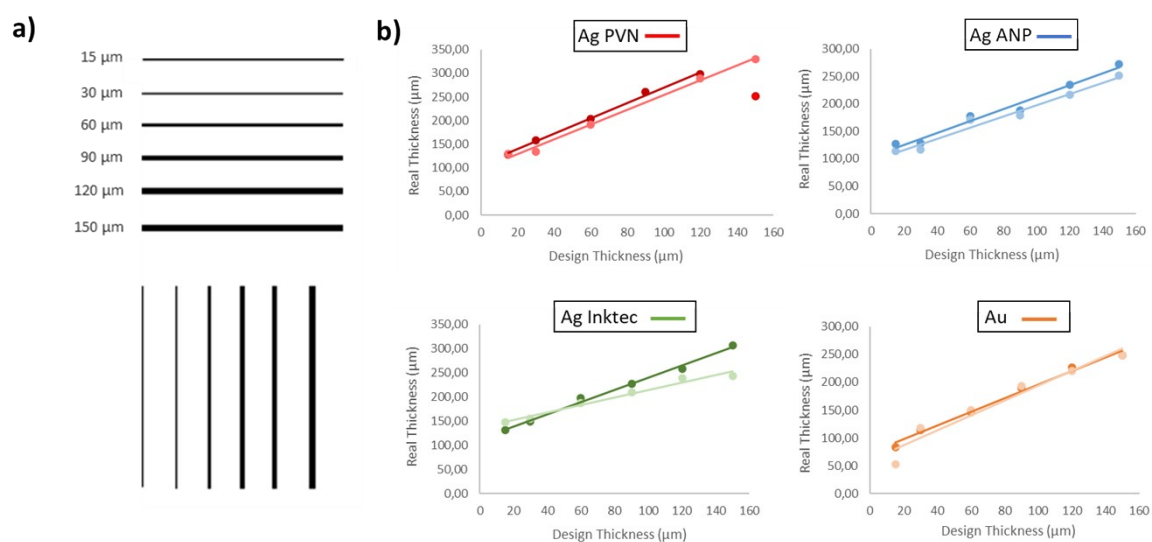| PVN	ANP

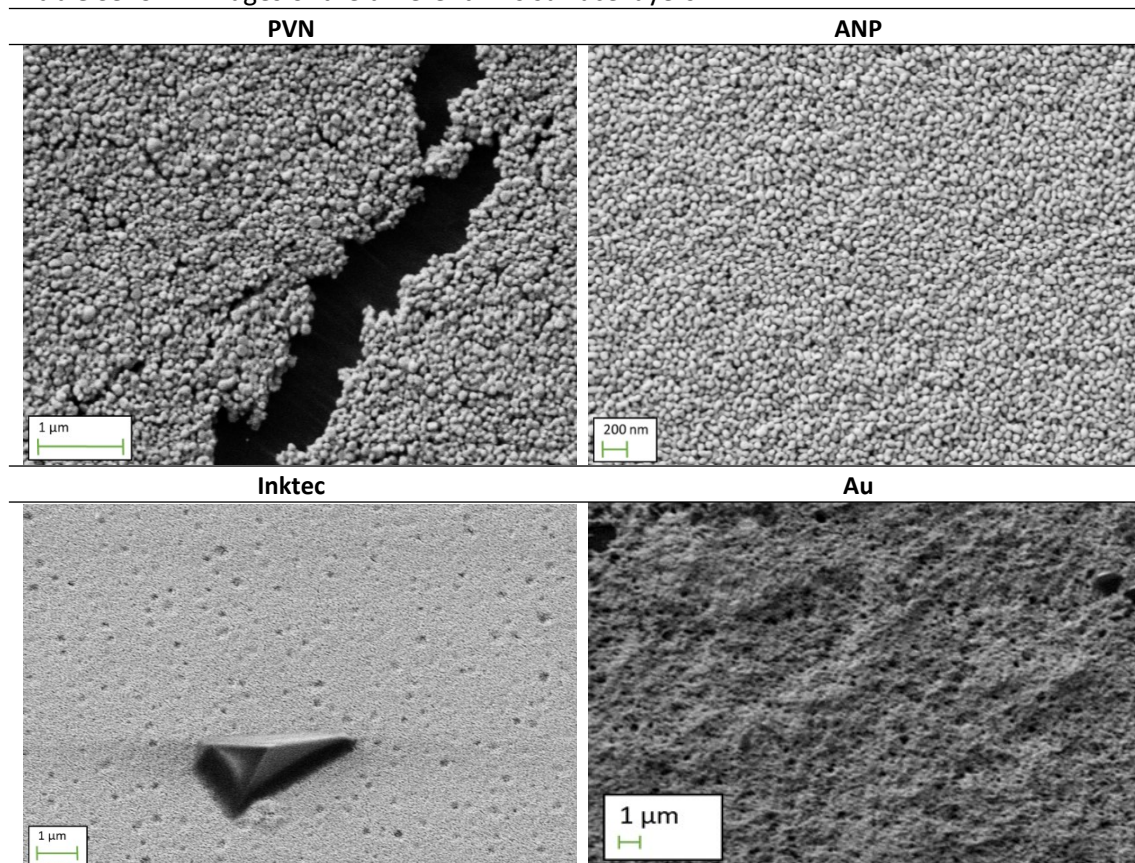| Inktec	Au

Figure S3. a) Line pattern printed to know the resolution of each ink. b) Representation of the line width in vertical and horizontal lines.
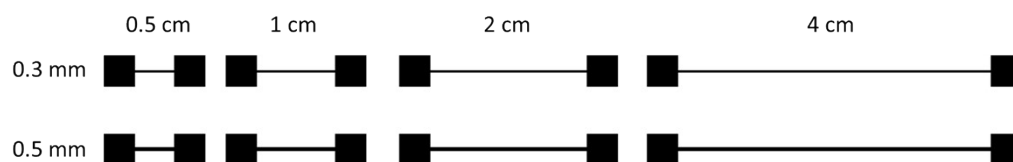
Figure S4. Line pattern designed to characterize the electrical parameters of the inks
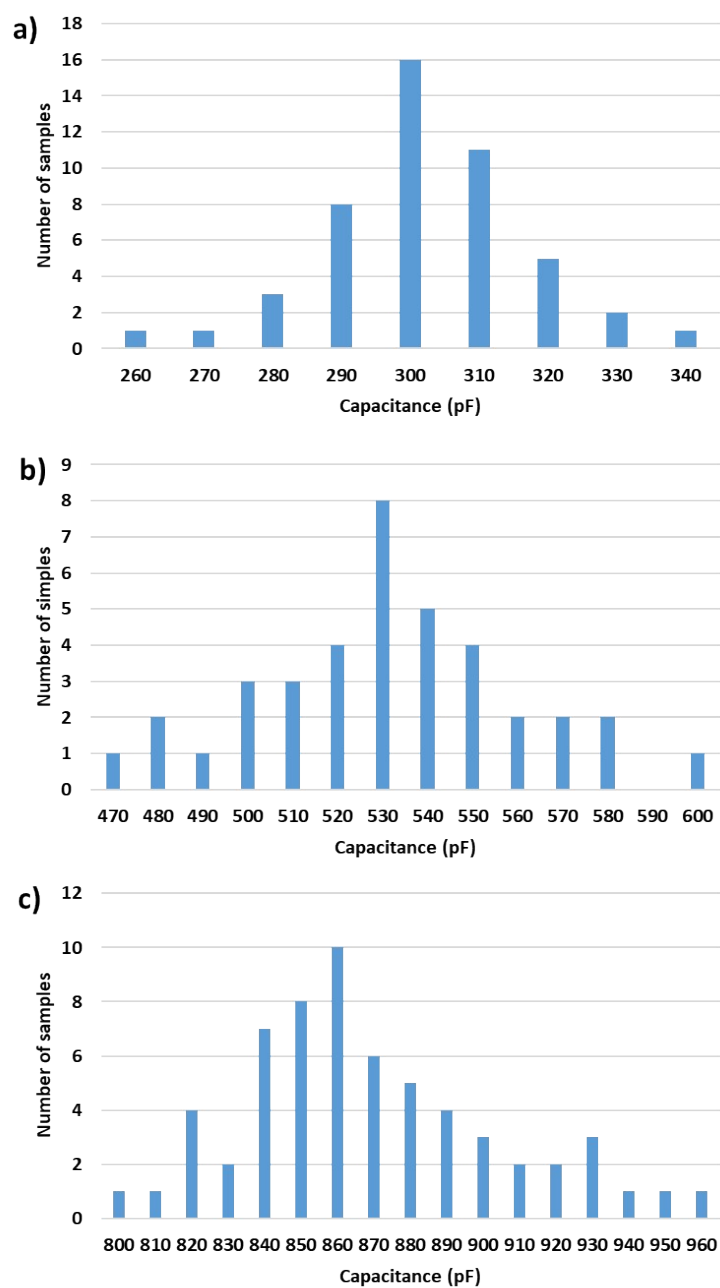

Figure S5. Gaussian distribution of the printed piezoelectric samples for the a) 3x3, b) 4x4) and c) 5x5 mm² printed electrodes area.
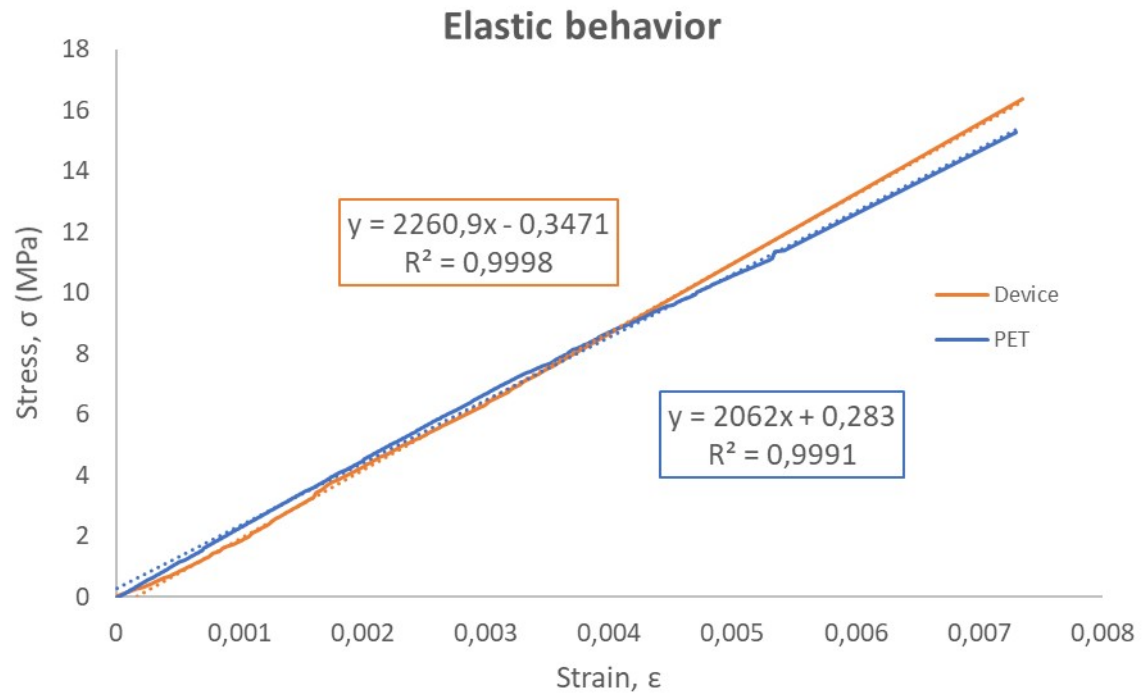
Figure S6. Elastic behavior of the stress-strain diagram to calculate the Young's modulus.