Supplemental material

Appendix A. Characterization of conductive inks

A printing on a plastic substrate (PET) was carried out. It allows one to have a resistance value reference for each of the inks. The obtained resistance values for each shape and ink are shown in Table A-1. For the sake of clarity, a letter has been added to the sample: Letter C indicates circumference, H horizontal, V vertical and D diagonal orientation.

Table A-1. Resistance (Ω) of the samples for each silver ink on a PET substrate after the second printing with two passes per printing. Letter C indicates circumference, H horizontal, V vertical and D diagonal orientation.

	DUPONT PE873	CREATIVE 127-48	NOVACENTRIC HPS-DEV FLX5	INKRON IPC-603X
S1-C	6.70±0.10	3.30±0.25	10.28±0.45	1.97±0.08
S2-C	8.31±0.53	4.20±0.55	13.69±0.86	2.45±0.21
S3-C	5.52±0.81	2.80±0.21	9.64±0.56	1.68±0.15
S4-V	1.45±0.08	0.67±0.01	1.50±0.20	0.47±0.01
S5-H	1.05±0.02	0.59±0.05	1.27±0.10	0.32±0.04
S6-H	1.52±0.11	0.81±0.02	2.13±0.15	0.45±0.01
S7-H	1.91±0.09	0.92±0.02	2.50±0.21	0.54±0.10
S8-H	2.30±0.20	1.28±0.04	2.94±0.18	0.67±0.07
S9-H	2.80±0.31	1.33±0.10	3.55±0.35	0.76±0.04
S10-H	3.32±0.10	1.63±0.09	4.19±0.11	0.84±0.07
S11-H	4.23±0.15	1.99±0.01	5.40±0.10	1.04±0.12
S12-H	6.21±0.73	2.83±0.03	7.18±0.10	1.35±0.21
S13-D	0.94±0.05	0.50±0.01	1.12±0.05	0.33±0.02
S14-D	1.62±0.12	0.77±0.01	1.97±0.17	0.47±0.02
S15-D	1.81±0.21	0.92±0.04	2.43±0.21	0.55±0.01
S16-D	2.35±0.15	1.06±0.03	3.08±0.31	0.66±0.07
S17-D	2.83±0.10	1.23±0.10	3.61±0.20	0.77±0.01
S18-D	3.10±0.20	1.49±0.15	4.53±0.08	0.90±0.06
S19-D	4.01±0.11	1.80±0.05	5.72±0.56	1.26±0.11
S20-D	5.82±0.20	2.50±0.68	7.26±0.35	1.62±0.06
S21-H	1.01±0.05	0.54±0.01	1.30±0.08	0.31±0.02
S22-H	1.10±0.08	0.51±0.01	1.41±0.05	0.35±0.01
S23-H	1.10±0.10	0.52±0.01	1.36±0.05	0.35±0.01

In order to double check the obtained values, the resistance was calculated considering the sheet resistivity given by the manufacturer (Table 3). For this calculation, the layer thickness obtained for each ink was measured.

The average thickness on the PET substrate for DUPONT PE873 is 1.2 µm, for CREATIVE 127-48 was 4.3 µm, for NOVACENTRIC HPS-DEV FLX5 was 10 µm and for INKRON IPC-603X was 7 µm.

The thickness of the conductor layer before drying can be calculated using Equation 1:

$$T_{\text{bd}} = (T_S \cdot A_s) + T_f \quad (1)$$

where T_{bd} is the conductor thickness before drying, T_S is the screen thickness, A_S is the open area of screen and T_f is the photo-sensible film thickness. Considering the values from the datasheet of the screen used for the conductors (230 mesh polyester material (PET 1500 90/230-48 from Sefar)) and the UV film (Dirasol 132 from Fujifilm), the obtained value for T_{bd} was 21.75 µm (T_S=71 µm, A_S =25% and T_f =4 µm)

T_{bd} is reduced after drying according to the % of solid content and the ink solvent type. For the DUPONT ink, the reduction after drying was 94.5%, for the CREATIVE ink 80.2%, for the NOVACENTRIC ink 54% and for the INKRON ink 67.8%.

Next, the value of the real resistivity was calculated and compared with the sheet resistivity provided by the manufacturer. Equations 2 and 3 allow to carry out the comparison:

$$R_{\mathrm{SX}} = \varrho \frac{L}{t \cdot W} \rightarrow \varrho = \frac{R_{\mathrm{SX}} \cdot t \cdot W}{L} \tag{2}$$

$$\varrho_{Sheet} = \frac{\varrho}{25\ \mu m} \tag{3}$$

where R_{SX} is the resistance of sample Sx, ρ is the resistivity, ρ_{sheet} is the sheet resistivity from the manufacturer, t is the layer thickness, L is the length and W the width of the resistance. The 25 µm value is the print thickness used by the manufacturers to specify the sheet resistivity.

Thus, for the ink DUPONT PE873, the resultant sheet resistivity is 7.5 mΩ/sq/mil (according to the manufacturer < 75 mΩ/sq/mil), for the ink CREATIVE 127-48, the resultant sheet resistivity is 12.5 mΩ/sq/mil (according to the manufacturer < 25 mΩ/sq/mil), for the ink NOVACENTRIC HPS-DEV FLX5, the resultant sheet resistivity is 80.6 mΩ/sq/mil (according to the manufacturer < 230 mΩ/sq/mil) and for the ink INKRON IPC-603X, the resultant sheet resistivity is 16 mΩ/sq/mil (according to the manufacturer < 15 mΩ/sq/mil).

Appendix B. Values of resistance

Table B-1 shows the value of the resistance of the most significant shapes (in this case, the ones with larger size) in function of the type of fabric, shape orientation, printing direction and inks. The measure of the value of the resistance was taken after the second printing.

Table B-1. Resistance value (Ω) of the most significant samples (larger size) depending on the fabrics, sample orientation, direction of the printing (0º same direction as the weft, 90º same direction as the warp and 45º diagonally to both) and inks. The measurement is made after the second printing. The measurement of infinite impedance (there is no conductivity) has been omitted to facilitate the reading of the table.

		DUPONT PE873			CREATIVE 127-48			NOVACENTRIC HPS-DEV FLX5			INKRON IPC-603X		
		0^0	45^0	90^0	0^0	45^0	90^0	0^0	45^0	90^0	0^0	45^0	90^0
Type_A	S3-C	-	-	-	-	-	-	-	-	-	-	-	-
	S4-V	-	-	-	-	-	-	-	223	76	56	116	3.1
	S5-H	-	-	-	-	-	-	-	450	-	14	270	0.4
	S13-D	-	-	-	-	-	-	147	376	133	-	95	2.5
Type B	S3-C	-	-	-	-	-	-	-	-	-	-	-	-
	S4-V	-	-	-	-	-	-	-	-	-	-	1.5	-
	S5-H	-	-	-	-	-	-	-	-	-	60	0.9	-
	S13-D	-	-	-	-	-	-	-	-	-	-	2.9	-
Type C	S3-C	-	-	-	-	-	-	-	-	-	2.6	25	-
	S4-V	2.5	265	21.2	4.7	10	4.2	1.5	8.9	17.2	0.5	0.5	3.8
	S5-H	7.9	-	-	3.2	114	3.4	3	34.4	22.4	0.3	0.5	0.9
	S13-D	42.6	-	-	4.3	12.5	2	2	15.3	13.8	0.3	0.4	0.9
Type D	S3-C	-	-	-	-	-	-	-	-	-	-	-	-
	S4-V	3.4	-	-	2.7	-	-	6.7	450	-	5	-	2.6
	S5-H	-	-	9.3	-	199	2.4	-	640	49	-	-	0.2
	S13-D	-	-	-	-	-	-	-	-	100	-	-	-
Type E	S3-C	-	-	-	-	-	-	-	-	-	-	-	-
	S4-V	-	-	-	-	-	-	-	-	-	-	-	-
	S5-H	-	-	-	-	-	-	-	-	-	-	-	-
	S13-D	-	-	-	-	-	-	-	-	-	-	-	-
Type F	S3-C	11.3	18.5	15.2	3.6	4	3.7	18.5	49.6	-	6.9	5	6.9
	S4-V	1.8	4.3	2.5	0.8	0.9	0.8	3.4	10.8	4.5	0.9	1	1.7
	S5-H	1.8	2.6	2.2	0.6	0.6	0.6	1.8	2.4	3.5	1.1	1.6	1.2
	S13-D	1.2	1.8	1.6	0.6	0.6	0.6	2.2	6.5	3.9	0.9	0.9	0.9
Type G	S3-C	4.6	3.9	2.8	5.7	21.6	-	-	-	-	1.3	1.3	1.6
	S4-V	0.8	0.6	0.6	0.5	1.7	3.2	11	742	1134	0.3	0.4	0.4
	S5-H	1	0.6	0.6	1	10.9	4.8	4	659	-	0.2	0.3	0.4
	S13-D	0.6	0.5	0.5	0.9	2.5	3.3	4.2	36	-	0.3	0.2	0.4
Type H	S3-C	35	38	54.8	13.5	-	-	-	-	-	1.6	5.4	1.7
	S4-V	2	1.9	2	0.8	1.1	0.8	8.6	10.7	7.2	0.3	0.4	0.3
	S5-H	1	2.5	2	0.6	1.9	2.1	2.5	86	13.7	0.3	0.3	0.3
	S13-D	1.1	1.1	1.6	0.6	0.7	1.5	3.6	7.5	3.6	0.3	0.3	0.3
Type I	S3-C	505	634	705	9.3	32.5	114	-	-	-	2.1	2	3.4
	S4-V	19.2	24.5	1.6	2	2.2	0.7	41.1	68	13.5	0.5	0.5	0.4
	S5-H	1.6	10.2	3.9	0.7	2.7	3.9	14.7	233	335	0.3	0.3	0.5
	S13-D	3.1	21.5	3.1	1	0.6	1.6	25.4	49	21.8	0.4	0.3	0.4
Type J	S3-C	-	-	-	-	-	-	-	-	-	12	1.7	1.8
	S4-V	-	33	133	-	-	-	-	124	43	0.7	0.3	0.3
	S5-H	-	301	7.4	-	-	-	-	12	90	0.3	0.4	0.2
	S13-D	10	3.9	3.5	-	-	-	-	17.5	-	0.7	0.2	0.2
Type K	S3-C	7.1	-	-	-	-	-	-	-	-	4.3	1	4.5
	S4-V	1	34	4	2.3	8.9	12.6	66	-	265	0.3	0.2	0.3
	S5-H	0.8	55	0.9	8.5	8.6	0.9	300	-	-	0.3	0.2	0.2
	S13-D	0.5	9.6	0.8	1.1	4.1	1.2	-	-	-	0.3	0.2	0.2

The result of the obtained resistance can be observed at a superficial level in Figures B-1 and B-2. These figures show the shape S4-V with an x8 magnification in function of the type of fabric, type of ink and printing direction, showing in each case the obtained value of resistance.

It can be observed that for the case of the fabrics with greater thickness, lower density and higher diameter of thread, the samples did not show electrical conductivity and the values of resistance obtained were very high (fabrics A, B, C, D and E). In most of these fabrics, it could be observed that the ink did not penetrate in the fabric or the printing was carried out only in the ridges of the fabric with no continuity of the silver through the sample. In the fabrics with the best results, a uniformity in the silver layer was observed. A higher or lower resistance value was obtained according to the quantity of silver that the fabric accepted; visually, it was very clear in fabrics G, H, I, J and K.

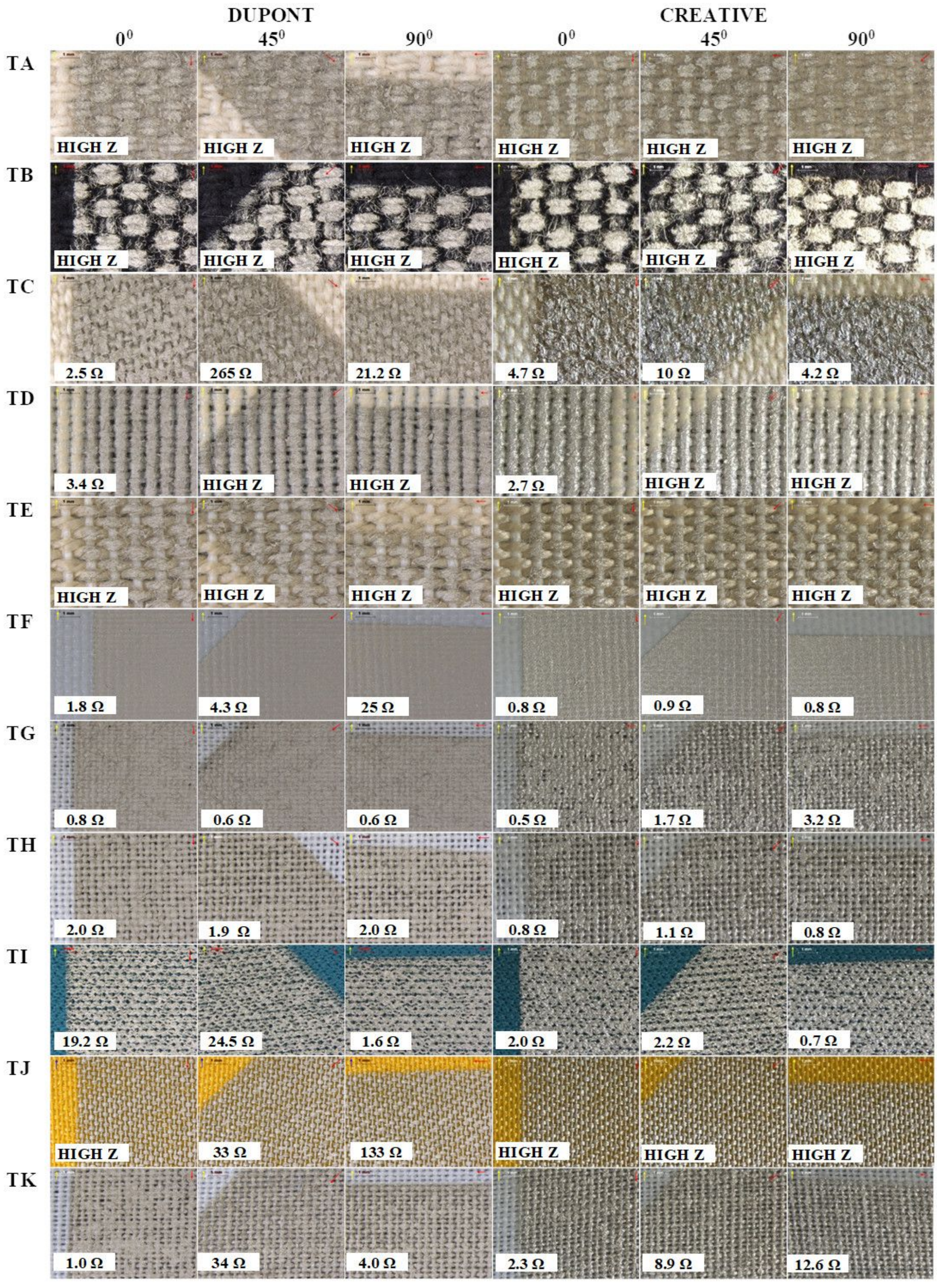

Figure B-1. Magnification (x8) of the printings with DUPONT and CREATIVE inks over the different fabrics with different directions of printing. The sample shown is S4-V. In each image, the value of the resistance after the second printing is shown.

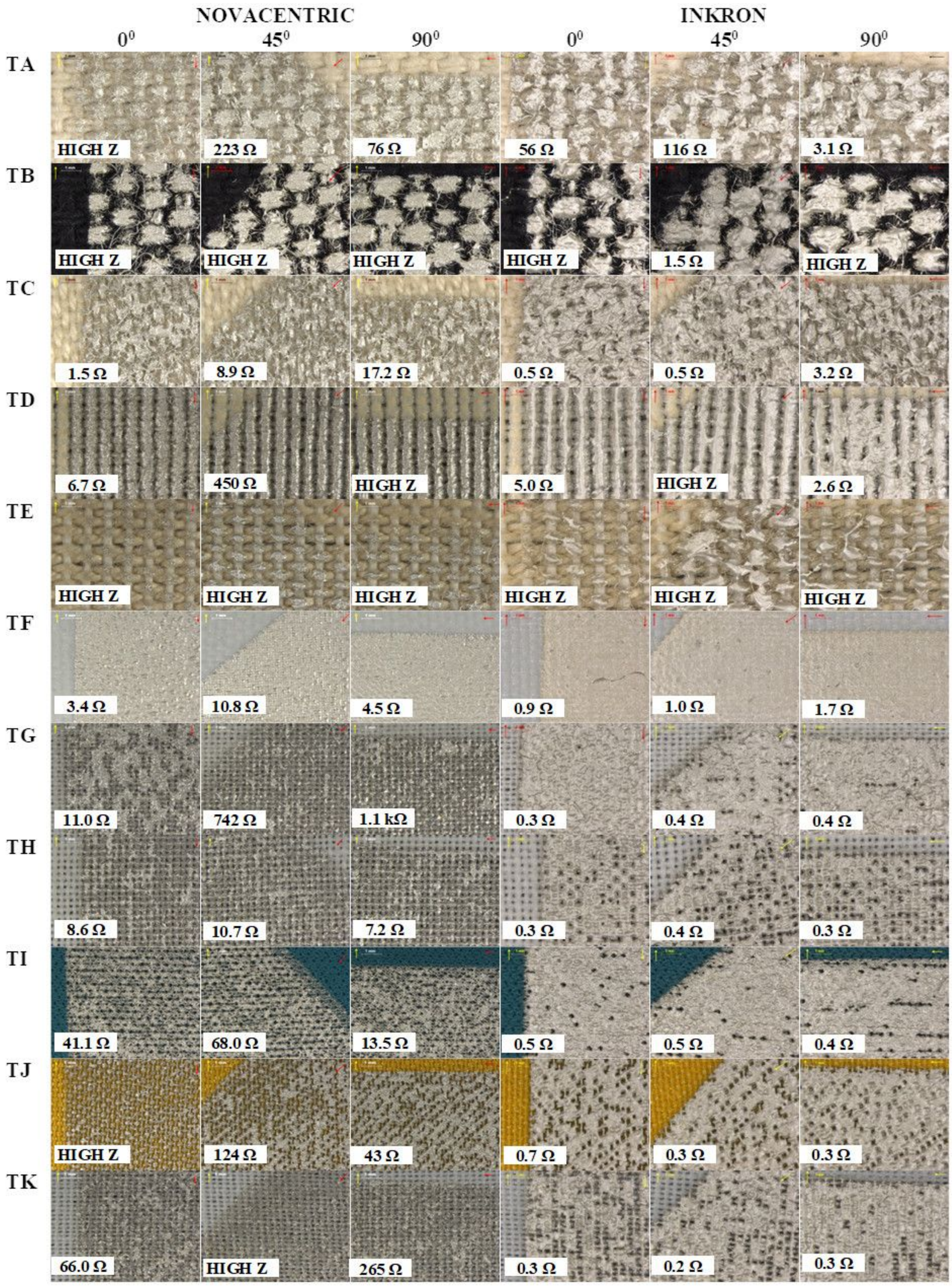

Figure B-2. Magnification (x8) of the printings with NOVACENTRIC and INKRON inks over the different fabrics with different directions of printing. The sample shown is S4-V. In each image, the value of the resistance after the second printing is shown.

Appendix C. SEM study

From Figure C-1 to Figure C-11, the SEM micrograph of each textile is shown. The top part corresponds to the DUPONT ink and the bottom part to the INKRON ink. The images on the left show the image by SE for a visual characterization of the textile and the ink. The images on the right show the maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In these last images, the silver particles can be observed due to their white intensity with respect to the rest of the elements.

Figure C-1 shows a magnification where the Ag flakes can be observed, on the DUPONT ink up to 10 µm and on the INKRON ink up to 15 µm. It is worth noting that the DUPONT ink has high viscosity and low solid content, whereas the INKRON ink has low viscosity and high solid content.

In Fabric A (Figure C-1), the DUPONT ink was deposited forming a small layer on the ridges of the fabric and did not penetrate inside of the fabric. However, the INKRON ink deposited on the ridges as well as on the trenches of the fabric, penetrating inside of the fabric. With none of the two inks (neither with the rest), fiber wetting occurred. The ink only recoated the bundle of fibers that composed the thread of the weft and the warp. A similar situation could be observed with fabric B (Figure C-2).

In fabric C (Figure C-3), the DUPONT ink, as well as the INKRON ink, covered well the surface of the fabric and filled up the openings. For the case of the DUPONT ink, a lower quantity of silver was observed, possibly due to the viscosity, and hence, a lower conductivity was obtained when comparing to the INKRON ink in this fabric.

In fabric D (Figure C-4), the inks had a very similar behaviour to that observed with fabric A.

The silver layer was very superficial (only on the ridges) in fabric E (Figure C-5). The DUPONT and INKRON inks did not obtain a good conductivity. The inks did not penetrate in the fabric; possibly due to the fact that the fabric had some superficial finishing process not allowing the inks to penetrate.

In fabric F (Figure C-6), both inks were perfectly screen printed; nevertheless, a higher quantity of silver was observed in the case of the INKRON ink. This possibly happened due to the highest amount of solids of this ink. Hence, the conductivities obtained with this fabric were better than those obtained with the INKRON ink.

Fabric G (Figure C-7) showed a good compatibility with both inks which were well screen printed and penetrated deeply in the fabric. This fact was confirmed with the high conductivities obtained. The same happened with fabric H (Figure C-8).

The behaviour of the inks in fabric I (Figure C-9) was very similar to the observed in the fabric C.

In fabric J (Figure C-10), the DUPONT ink hardly penetrated in the fabric, whereas the INKRON ink penetrated inside of the fabric. This behaviour could be due to the ink density and the shape of the ligament of this fabric.

Lastly, in fabric K (Figure C-11), the two inks were well screen printed, but the best behaviour was observed in the case of the INKRON ink, agreeing with the resistance values obtained.

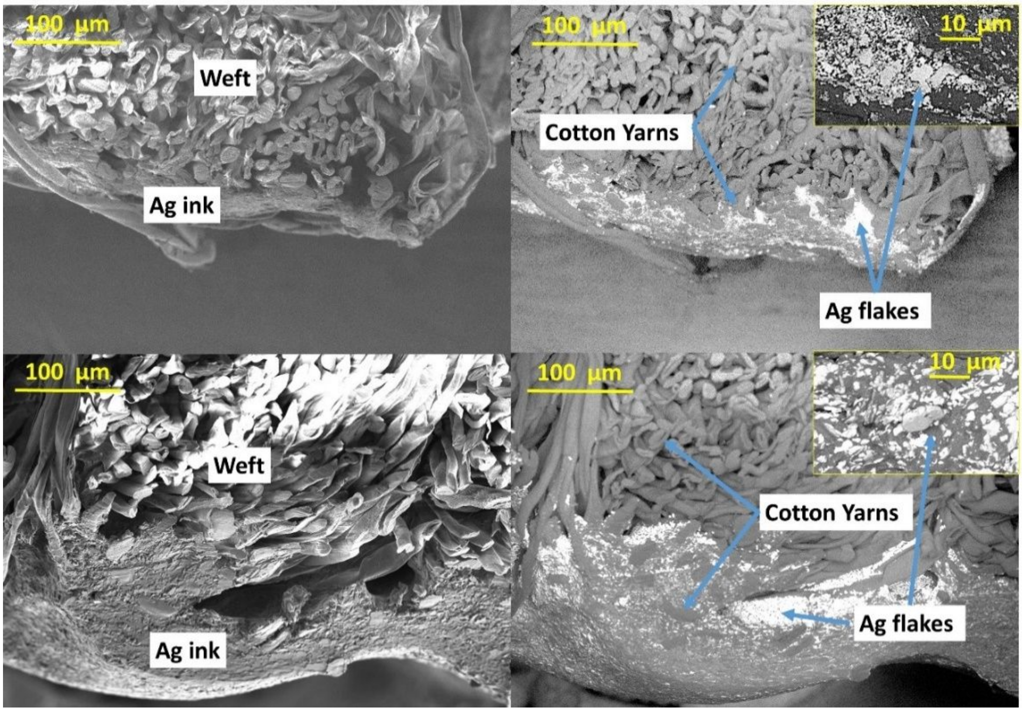

Figure C-1. Fabric A printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

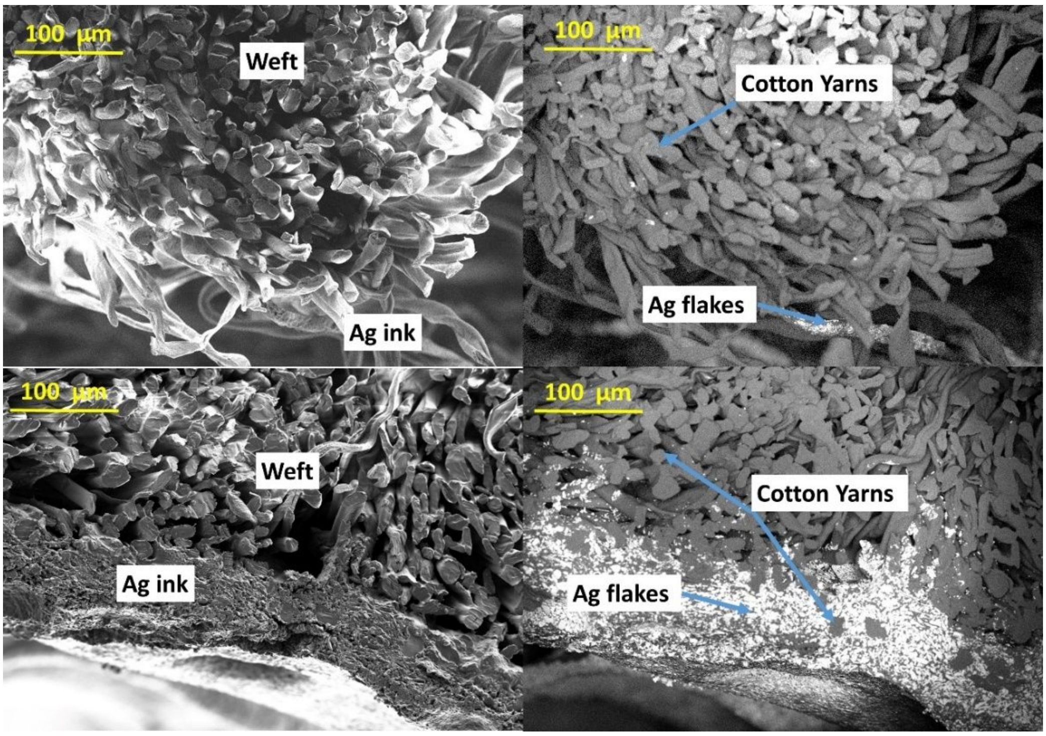

Figure C-2. Fabric B printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

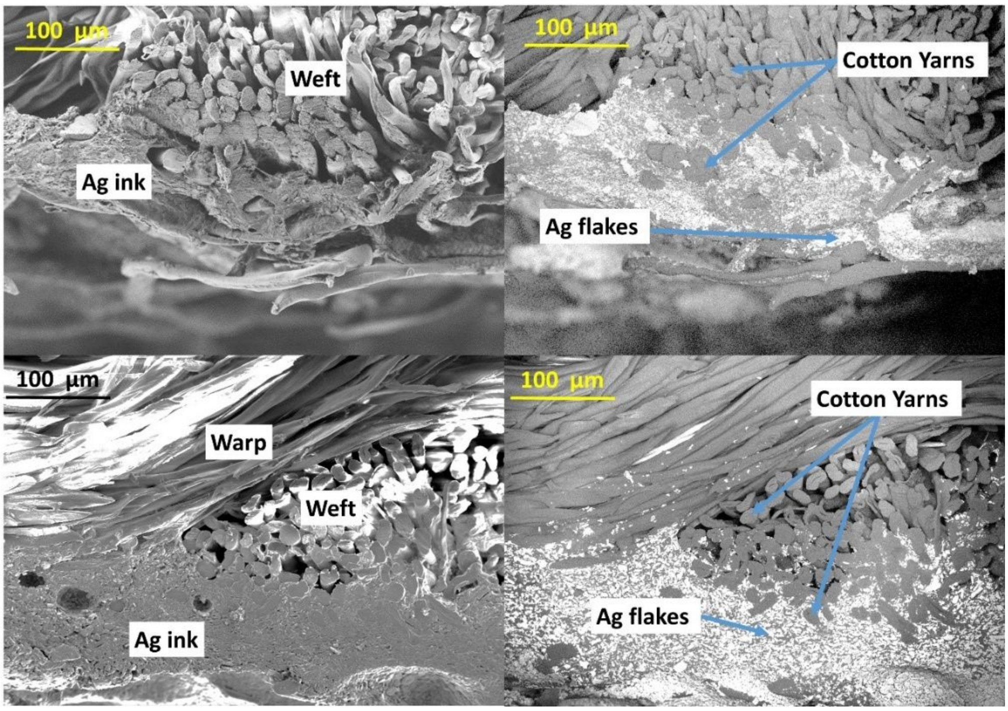

Figure C-3. Fabric C printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

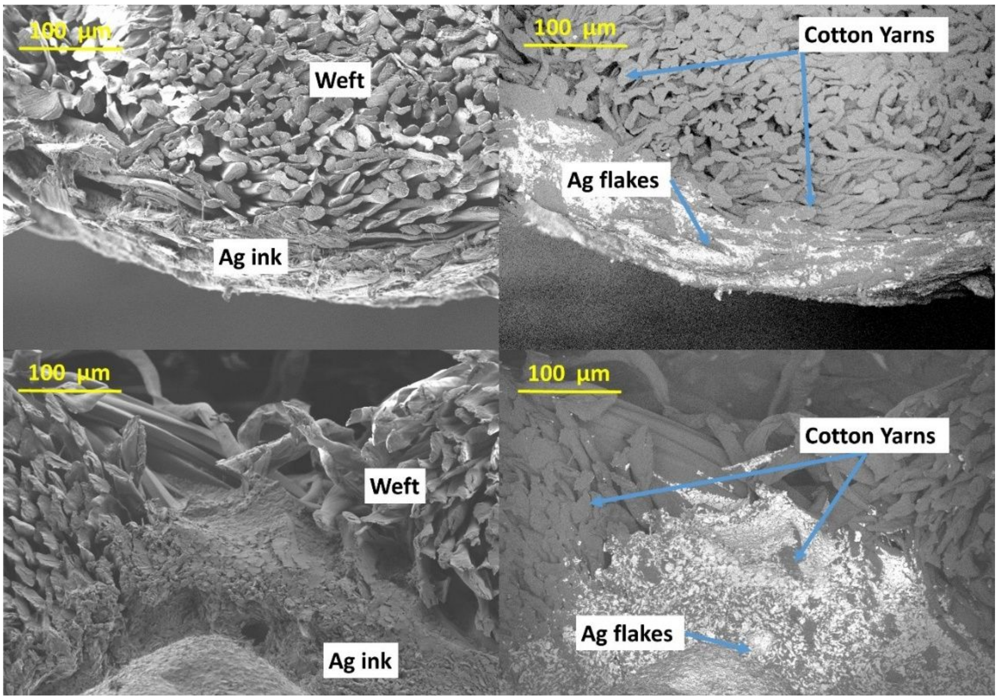

Figure C-4. Fabric D printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

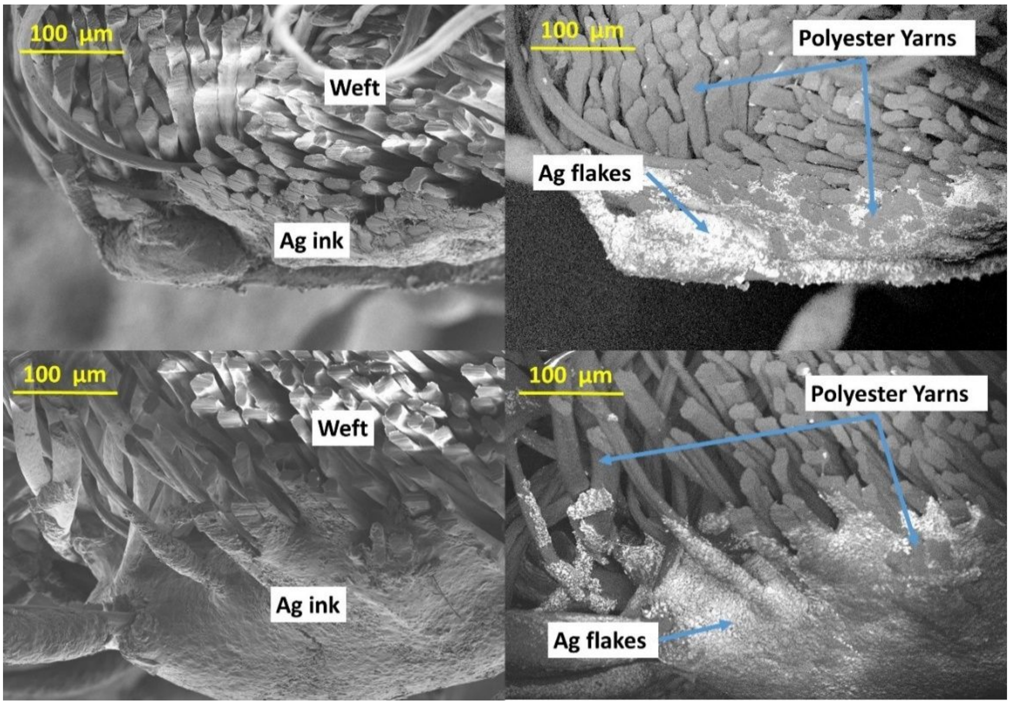

Figure C-5. Fabric E printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

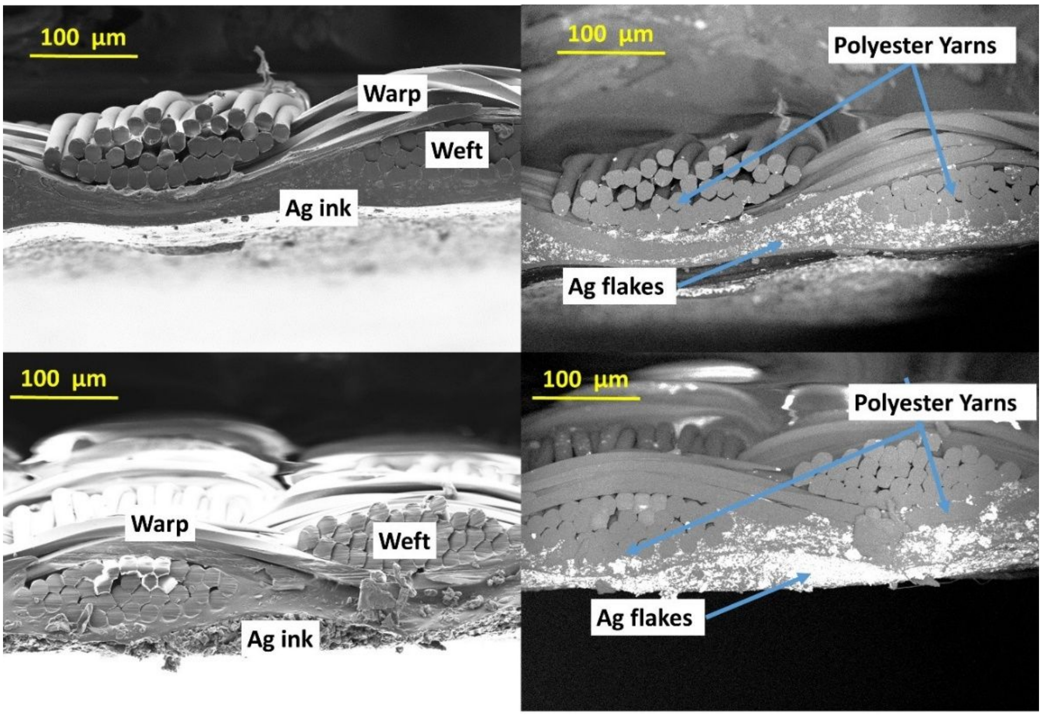

Figure C-6. Fabric F printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

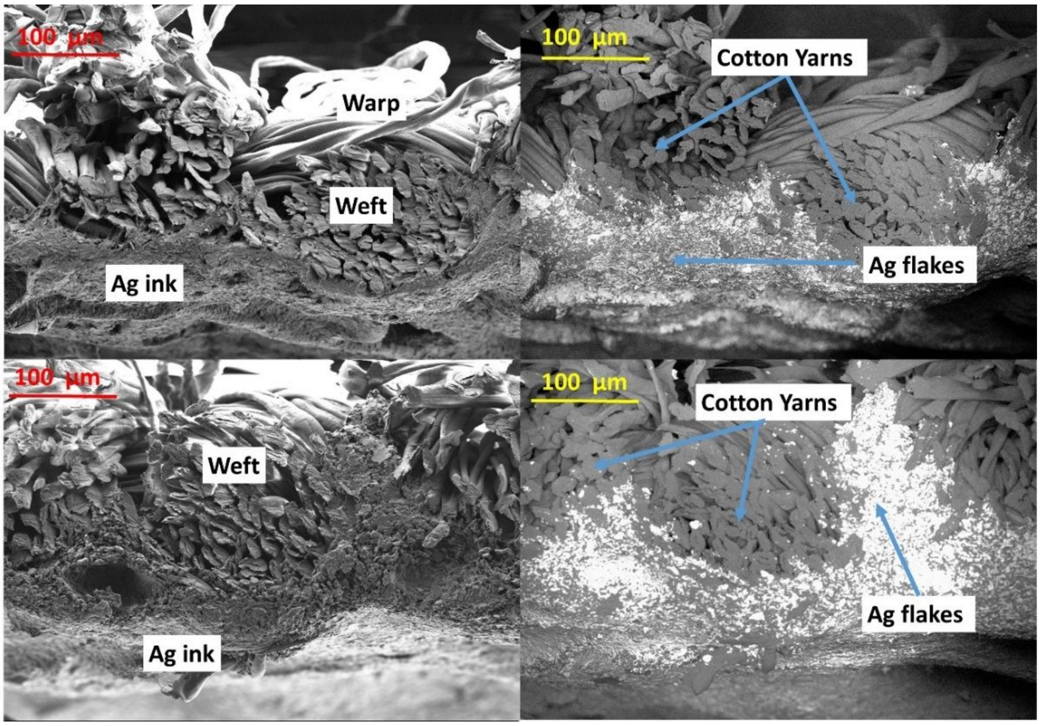

Figure C-7. Fabric G printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

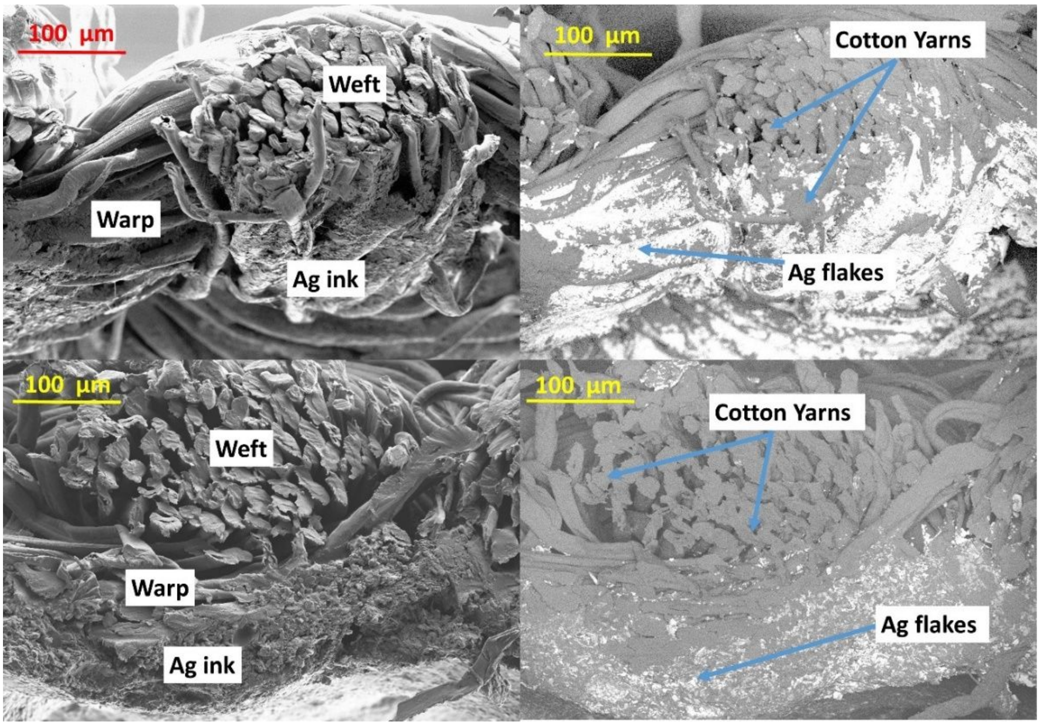

Figure C-8. Fabric H printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

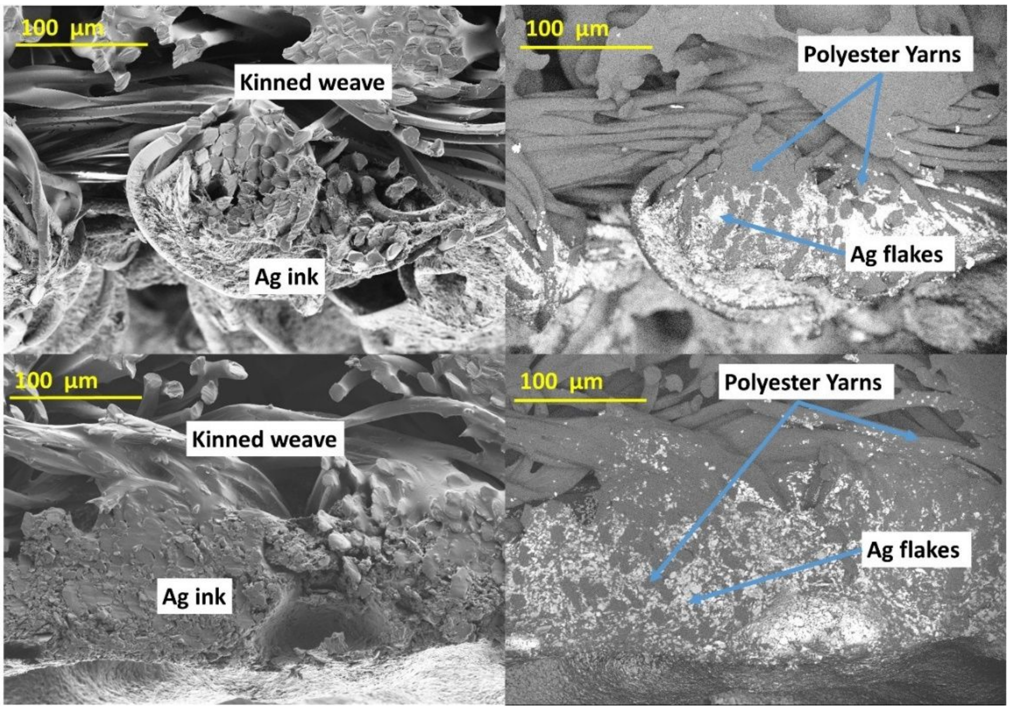

Figure C-9. Fabric I printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

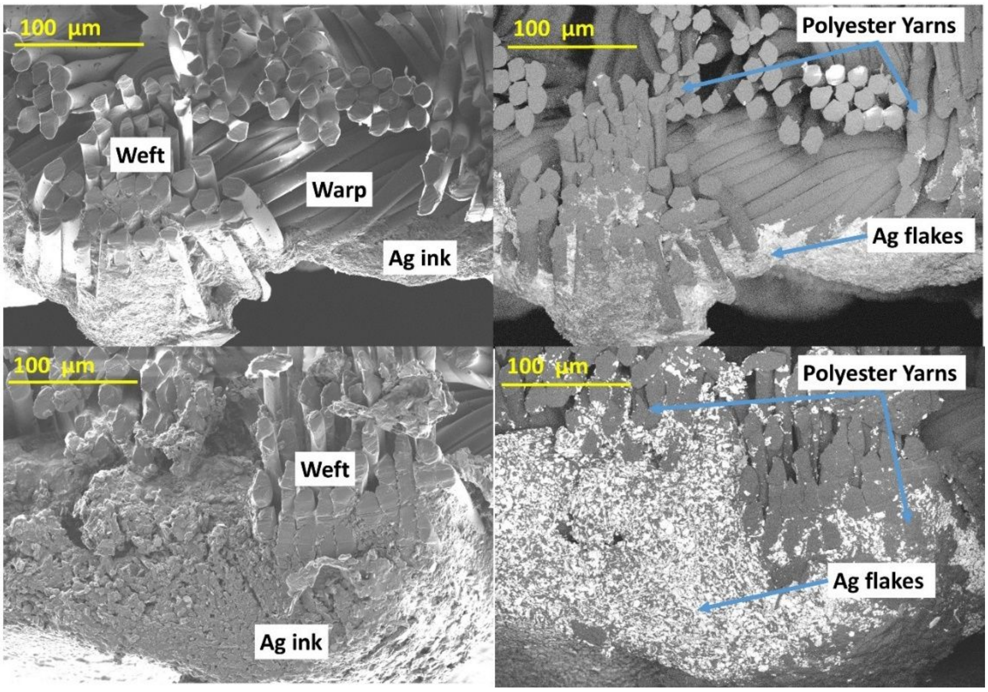

Figure C-10. Fabric J printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

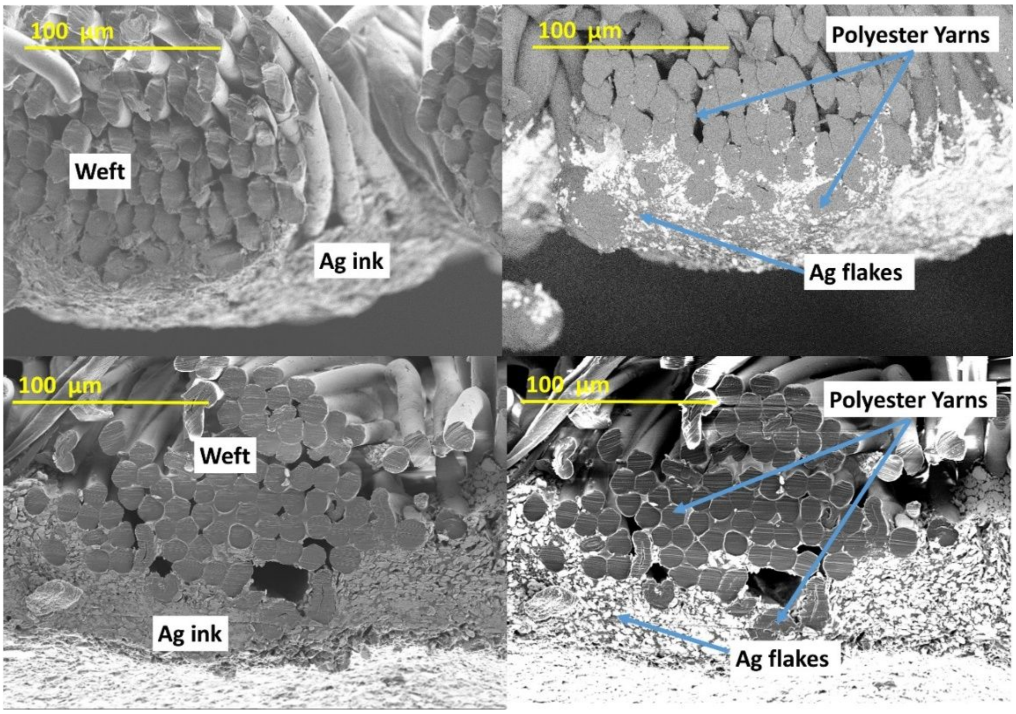

Figure C-11. Fabric K printed with DUPONT ink (top) and INKRON ink (bottom). The SE images on the left show a visual characterization of the fabric and ink, and the images on the right show maps of crystalline and textural orientations by EBSD for a determination of the position of the silver particles. In the upper rectangles an enlargement is displayed to visualize the Ag flakes.

Appendix D. resistance of the conductors over dielectrics

Table D-1 shows the value of the resistance of the more significative samples (in this case, the ones with the highest size) in function of the type of fabric and shape orientation.

Table D-1. Resistance value (Ω) of the most significant samples (larger size) depending on the fabrics and dielectrics and sample orientation for CREATIVE 127-48 Silver ink. Direction of the printing is 0º (same direction as the weft). The measurement is made after the second printing.

		Without Dielectric	CREATIVE 127-48D	EMS DI-7542	INKRON IPD-670
Type A	S3-C	-	-	-	-
	S4-V	-	-	-	-
	S5-H	-	-	-	-
	S13-D	-	-	-	-
Type C	S3-C	-	-	-	-
	S4-V	4.7	299	-	-
	S5-H	3.2	85	-	-
	S13-D	4.3	33	-	50
Type D	S3-C	-	-	-	-
	S4-V	2.7	60	150	14
	S5-H	-	-	-	-
	S13-D	-	-	-	10
Type E	S3-C	-	-	-	-
	S4-V	-	-	-	-
	S5-H	-	-	-	-
	S13-D	-	-	-	-
Type K	S3-C	-	-	68	27
	S4-V	2.3	9.4	14	7
	S5-H	8.5	2.4	2.6	8.8
	S13-D	1.1	1.8	6	6.4

Appendix E. resistance of the conductors over polyurethanes

After heat sealing the polyurethanes, the printing of the conductive ink was made with the results shown in Table E-1.

Table E-1. Resistance value (Ω) of the most significant samples (larger size) depending on the fabrics and polyurethanes and sample orientation for CREATIVE 127-48 Silver ink. The measurement is made after the second printing.

		DELSTAR EU50	DELSTAR EU94DS	INSPIRE 2370	ADHESIVE FIMS UAF-445
Type A	S3-C	35.8	23.5	21.7	18.7
	S4-V	5.3	3.1	2.7	2.9
	S5-H	3.7	1.8	1.5	2.3
	S13-D	1.3	1.7	1.3	1.3
Type C	S3-C	25.4	30.8	11.3	20.9
	S4-V	2.9	3.9	2.2	5.6
	S5-H	1.7	2.8	1.0	3.0
	S13-D	1.7	2.1	1.1	2.8
Type D	S3-C	16.2	24.2	15.0	26.0
	S4-V	2.0	4.3	2.2	5.2
	S5-H	1.8	2.3	1.5	3.9
	S13-D	1.0	2.4	1.7	3.4
Type E	S3-C	16.9	12.8	10.7	19.1
	S4-V	2.5	2.4	2.5	4.5
	S5-H	1.5	1.3	1.2	2.1
	S13-D	1.0	1.4	1.8	1.8
Type K	S3-C	21.3	20.4	15.4	27.0
	S4-V	3.9	2.9	3.0	5.1
	S5-H	2.8	3.5	2.0	2.8
	S13-D	2.1	1.5	1.6	2.4

Figure E-1 shows the percentual increment of the value of the resistance in function of the elongation of the sample for the four films of polyurethane and for the CREATIVE and INKRON inks. The non-stretchable ink (CREATIVE) suffered a high variation in the value of the resistance of the samples, achieving a 650% of increment of resistance at a 10% of elongation against the 250% obtained with the INKRON ink. The type of polyurethane film influenced the final result as well, observing that with DELSTAR EU94, lower resistance increments were obtained, increasing progresively with the films EU50, INSPIRE 2370 and UAF-455. Considering a maximum elongation of 10% of a square surface in the two axis produces that the area only increments 2%.

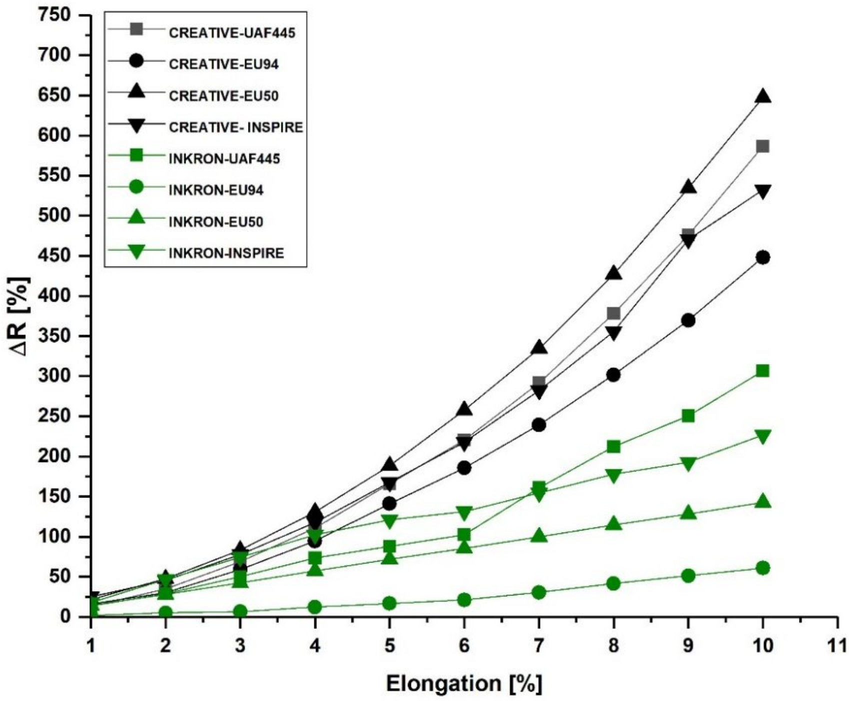

Figure E-1. Percentual increment of the value of resistance in function of the elongation of the sample for the four films of polyurethane and for the inks CREATIVE and INKRON.

Appendix F. Expected Capacitance: extended study

Figure F-1 shows the expected value of the most problematic fabrics (A, C, D, E and K) with the dielectric inks. Fabric B values have been omitted for being very similar to fabric A values. In addition, when adding the dielectric layer, a higher total thickness of dielectric was obtained and, therefore, the capacities could decrement, as long as the total relative permittivity of the fabric and the dielectric did not increment excessively. Looking at this variation with fabric A, with an expected capacitance of 38 pF, a variation oscillating between 19 and 35 pF was obtained, depending on the dielectric ink applied (Figure F-1). With fabric C, with a capacitance of 60 pF, the variation was between 34 and 62 pF. In fabric D, with a capacitance of 40 pF, the corresponding variation was between 39 and 67 pF. Fabric E, with a capacitance of 13 pF, suffered a variation between 20 and 31 pF. Lastly, for fabric K, with 63 pF of capacitance, the obtained variation was between 45 and 76 pF. The variation was not due to the same dielectric, but to the influence of the dielectric on the total relative permittivity and not on the total thickness that did not seem to have much variation. For fabrics A and K, the best dielectric is CREATIVE 127-48D and for fabrics C, D and E, the best one is EMS DI-7542. The permittivity of fabrics A and K was reduced with CREATIVE 127-48D but was incremented with the rest. On the other hand, for fabrics C, D and E, the permittivity was incremented with all the dielectrics, but the increment was lower with EMS DI-7542. The variations of the permittivity could be related to the quantity of air between the fabric and the dielectric after the printing and to the irregularity of the dielectric ink through the fabric.

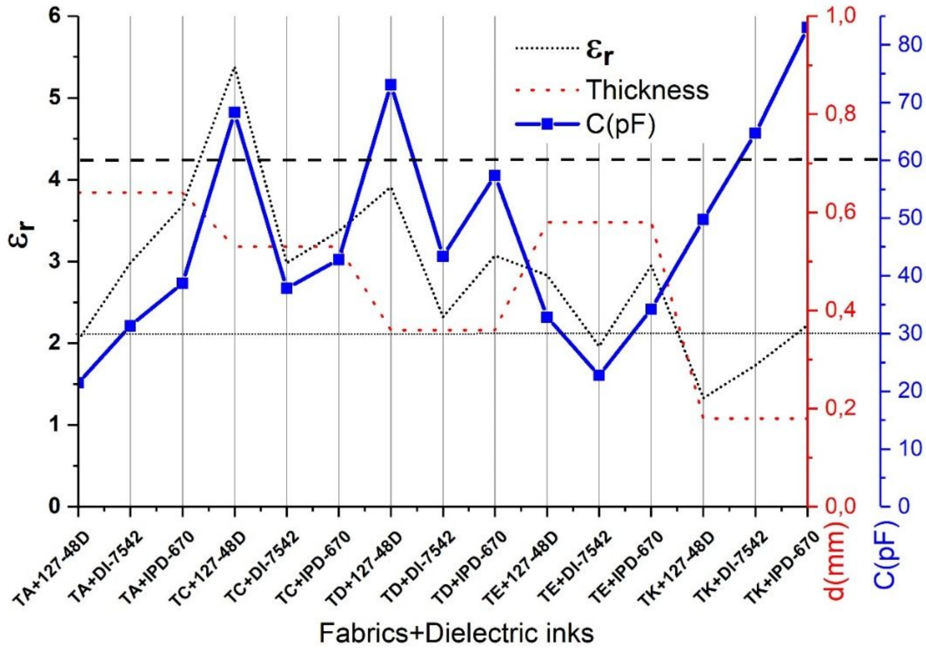

Figure F-1. Expected value of the capacitance in function of the fabrics with dielectric ink.

Figure F-2 shows the expected value for the same problematic fabrics (A, C, D, E and K) and the polyurethane film. Fabrics A, C and D had low values of thickness and high values of relative permittivity, obtaining capacities between 20 and 40 pF. Fabric E obtained capacities below 25 pF. The results are quite similar for each fabric using the different polyurethanes. Lastly, fabric K had a very low value of thickness and a relative permittivity valuer between 1.5 and 2, therefore achieving very high values of capacitance (>70 pF), except for Inspire polyurethane that obtains 55 pF, under the threshold of 60 pF.

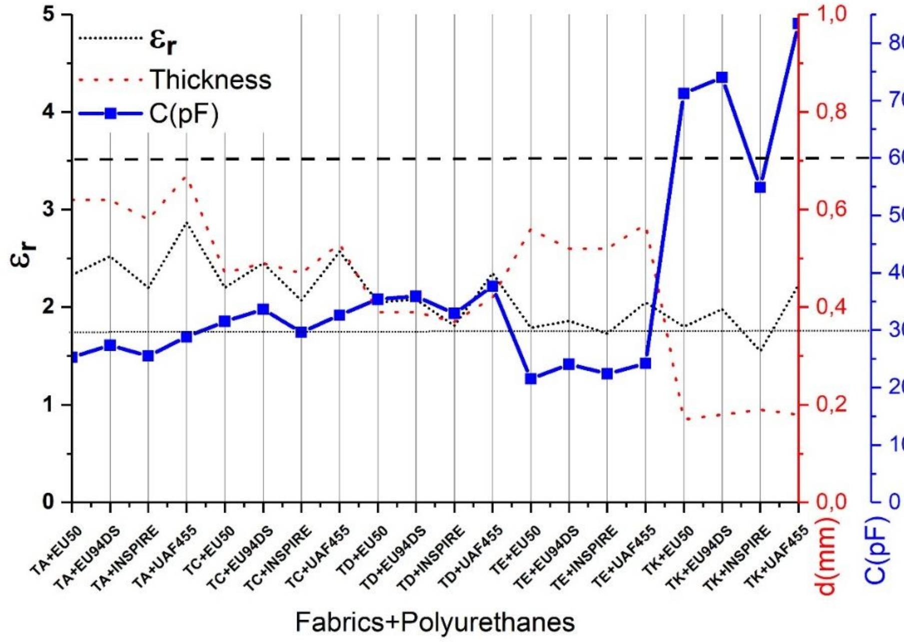

Figure F-2. Expected value of the capacitance in function of the fabrics with a polyurethane film in only one side of the fabric.

As the polyurethanes has similar results on the same fabric, one of them was selected for further test. Focusing only on one polyurethane film, UAF-455, it was possible to determine the estimated value of the capacitance when the polyurethane is applied in only one side (Figure F-3) and in both sides of the fabric (Figure F-4). In the first case, fabrics A, B and E allowed to obtain capacities lower than 30 pF and fabrics C, D, I, J and K lower than 60 pF. Fabrics F, G and H exceeded the limit of 60 pF. In the case of two layers de polyurethane, the capacitance was improved in all the fabrics, except in fabric F, that was rejected since it exceeded 60 pF.

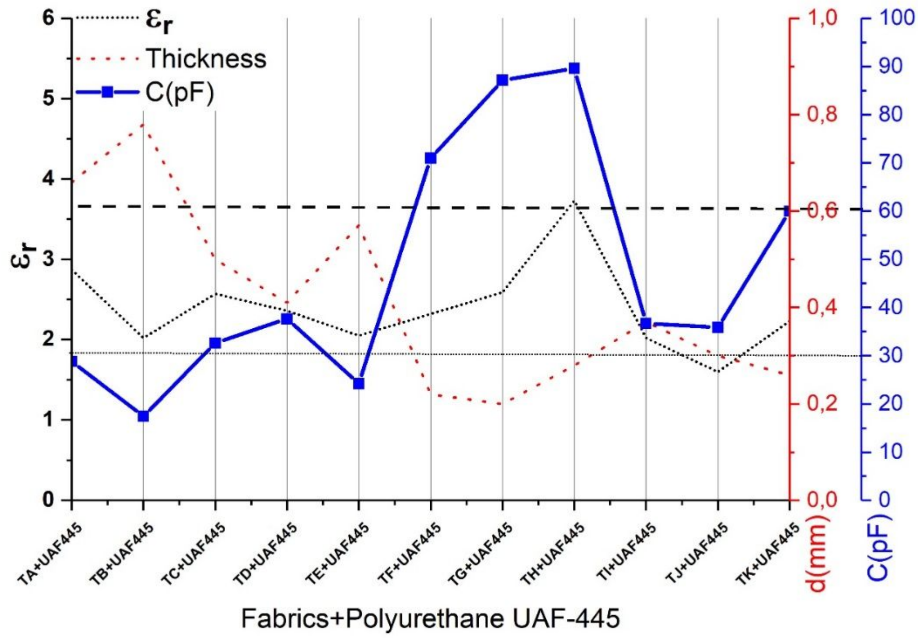

Figure F-3. Expected value of the capacitance in function of the fabrics with a polyurethane film EUF-455 in only one side of the fabric.

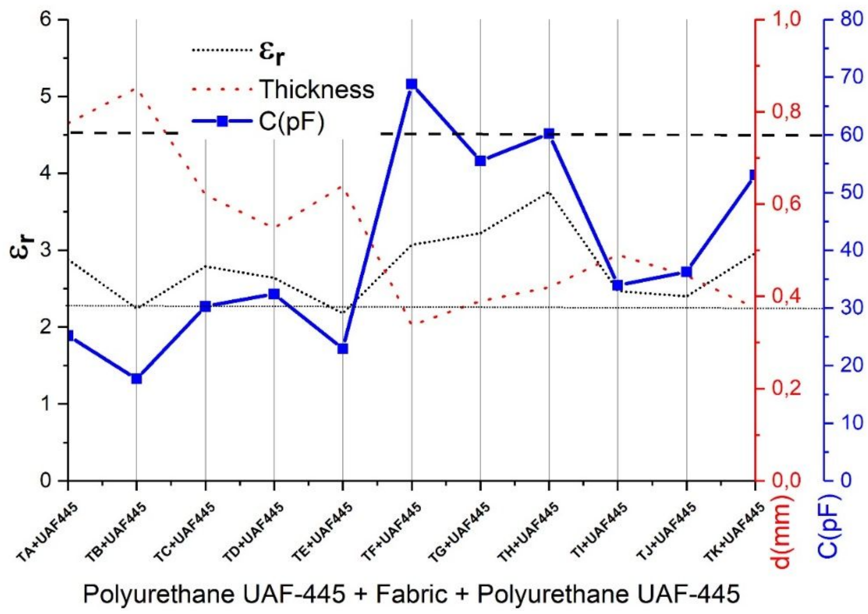

Figure F-4. Expected value of the capacitance in function of the fabrics with a polyurethane film EUF-455 in both sides of the fabric.