Supplementary Information

Three-Dimensionally Printed Pressure Sensor Arrays from Hysteresis-Less Stretchable Piezoresistive Composites

Jong Hyun Kang,[a,b] Ju Young Kim,[a] Yejin Jo,[a,c] Hyun-Suk Kim,[b] Sung Mook Jung,[a] Su Yeon Lee,[a] Youngmin Choi,[a,c,*] Sunho Jeong[d,*]

[a]Division of Advanced Materials, Korea Research Institute of Chemical Technology (KRICT), 141 Gajeong-ro, Yuseong-gu, Daejeon 305-600, Korea

[b]Department of Materials Science and Engineering, College of Engineering, Chungnam National University, 99 Daehak-ro, Yuseong-gu, Daejeon 305-764, Korea.

[c]Department of Chemical Convergence Materials, Korea University of Science and Technology (UST), 217 Gajeong-ro, Yuseong-gu, Daejeon 305-350, Korea

[d]Department of Advanced Materials Engineering for Information and Electronics, Kyung Hee University, Yongin-shi, Gyeonggi-do 17104, Korea

J. H. Kang and J. Y. Kim contributed equally to this work

*E-mail: youngmin@krict.re.kr (Y. Choi); sjeong@khu.ac.kr (S. Jeong)

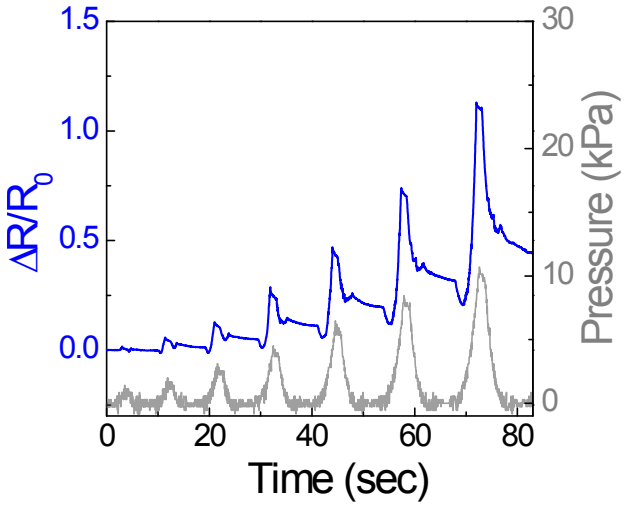

Figure S1. Resistance signal for the PDMS flat pressure sensor device.

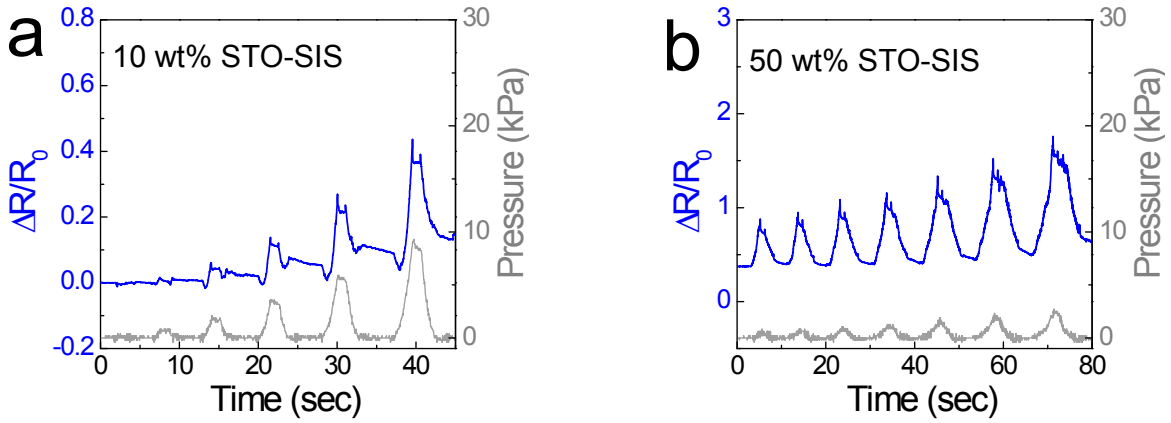

Figure S2. Resistance signals for (a) 10 wt% STO-SIS and 50 wt% STO-SIS flat pressure sensor devices.

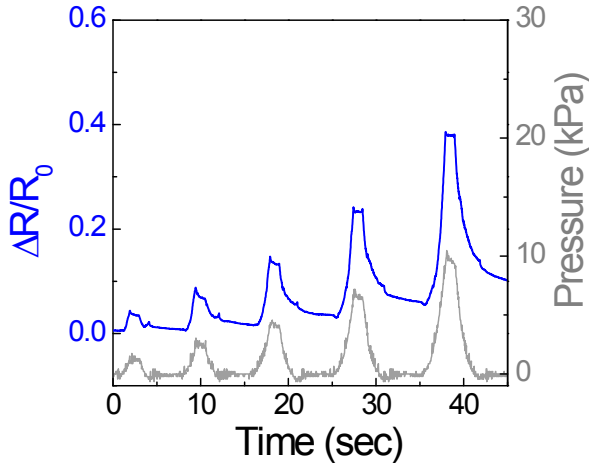

Figure S3. Resistance signal for the 30 wt% SML-SIS flat pressure sensor device.

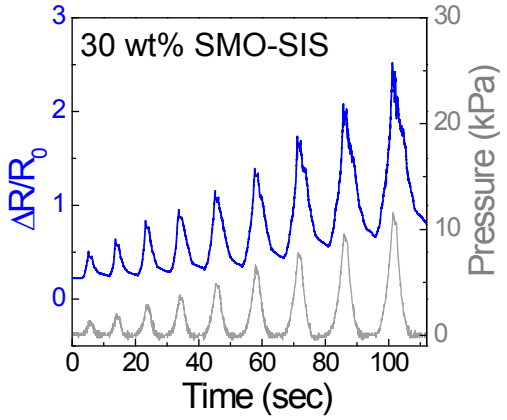

Figure S4. Resistance signal for the 30 wt% SMO-SIS flat pressure sensor device.

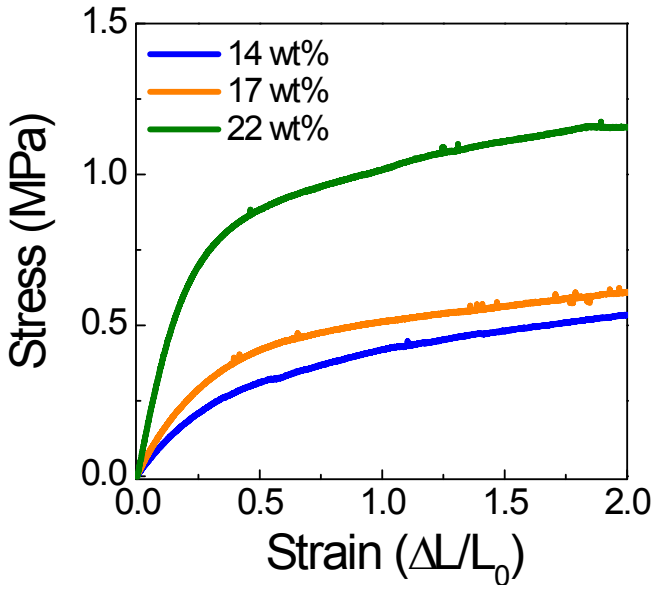

Figure S5. Stress-strain curves for the SIS films with styrene compositions of 14, 17, and 22 wt%.

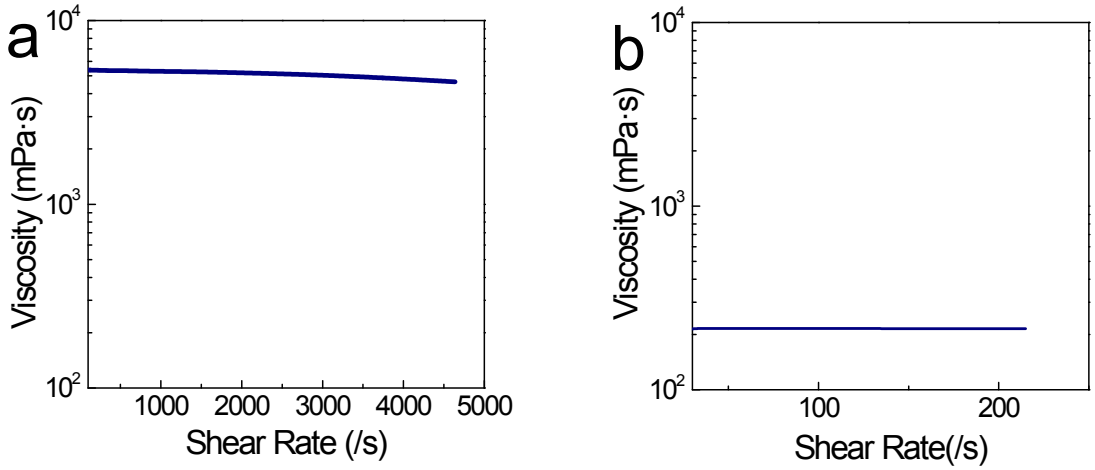

Figure S6. Viscosity data in relation to shear rate for (a) SML and (b) STO surfactants.

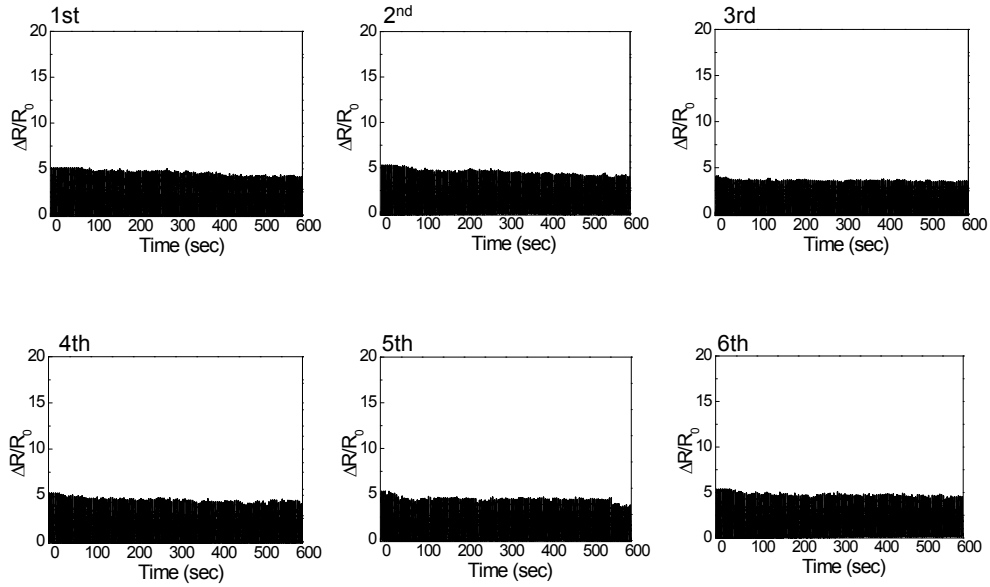

Figure S7. Resistance signal data for 792-times repeated measurements at a pressure of 30 kPa for the 30 wt% STO-SIS flat pressure sensor device.

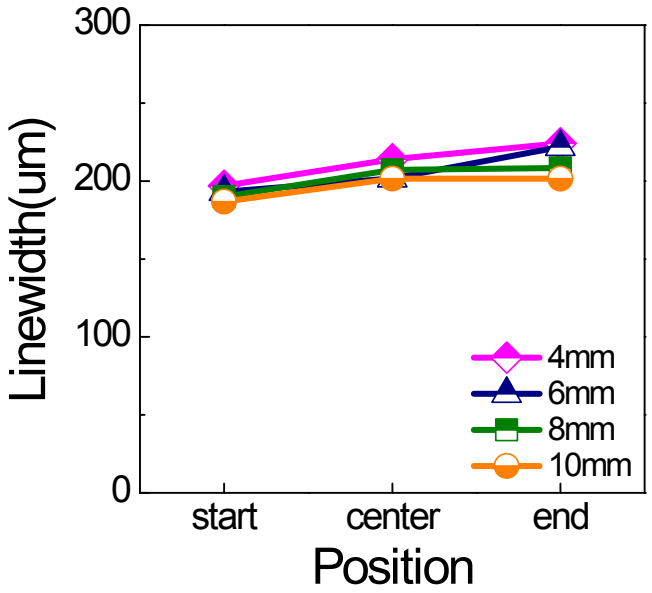

Figure S8. Variations in linewidth for the lines printed on top of structures with various air-gap distances.

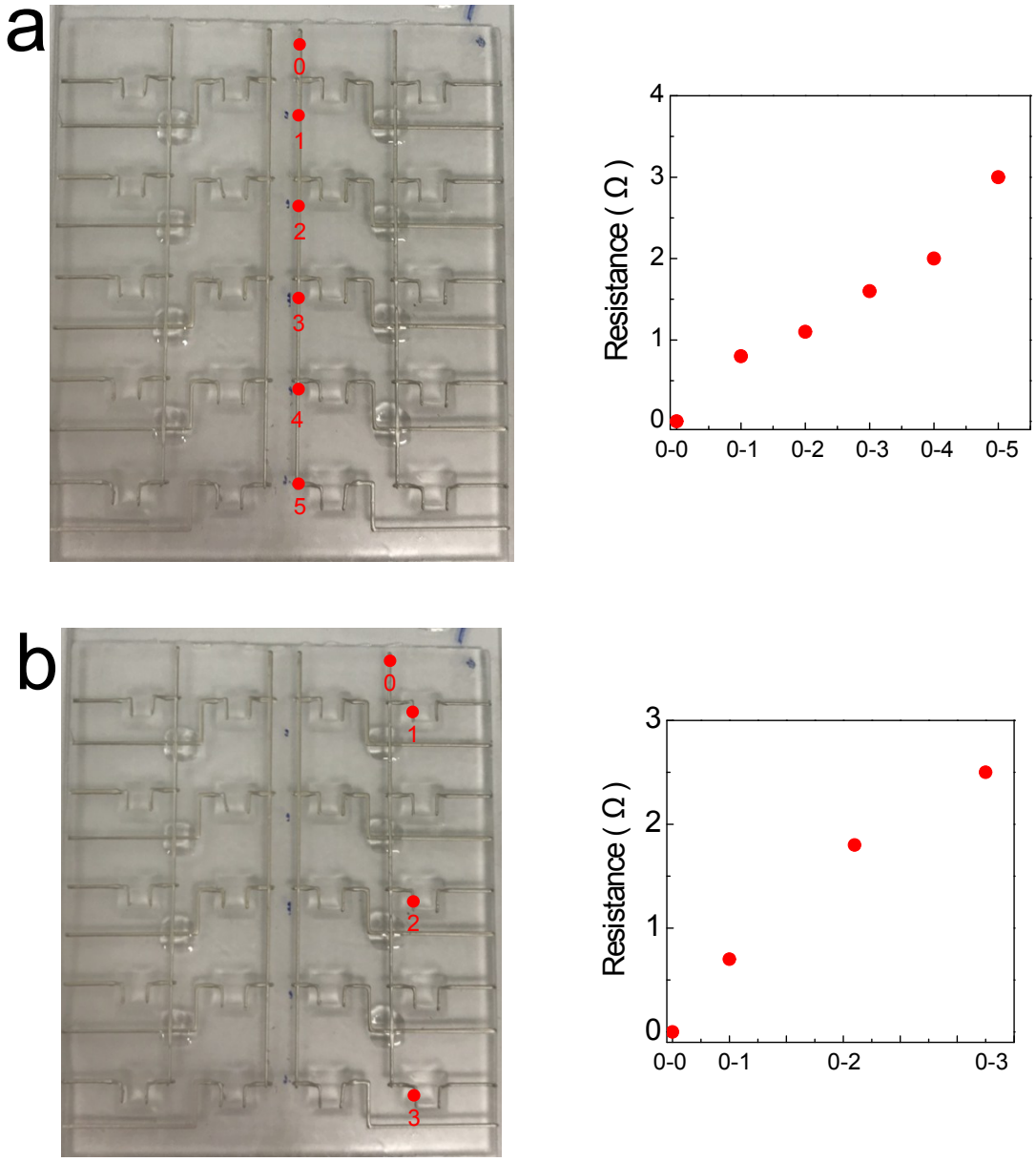

Figure S9. Resistance measured at various positions in the Ag electrode-printed array device (without multi-stacked sensor layers).

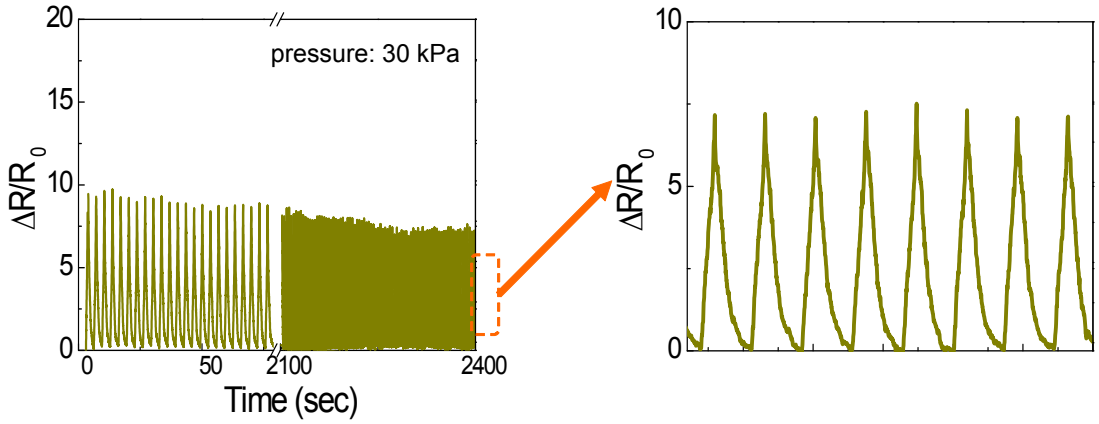

Figure S10. Resistance signal in 664-times repeated measurement at a pressure of 30 kPa for the 3D-printed array device.

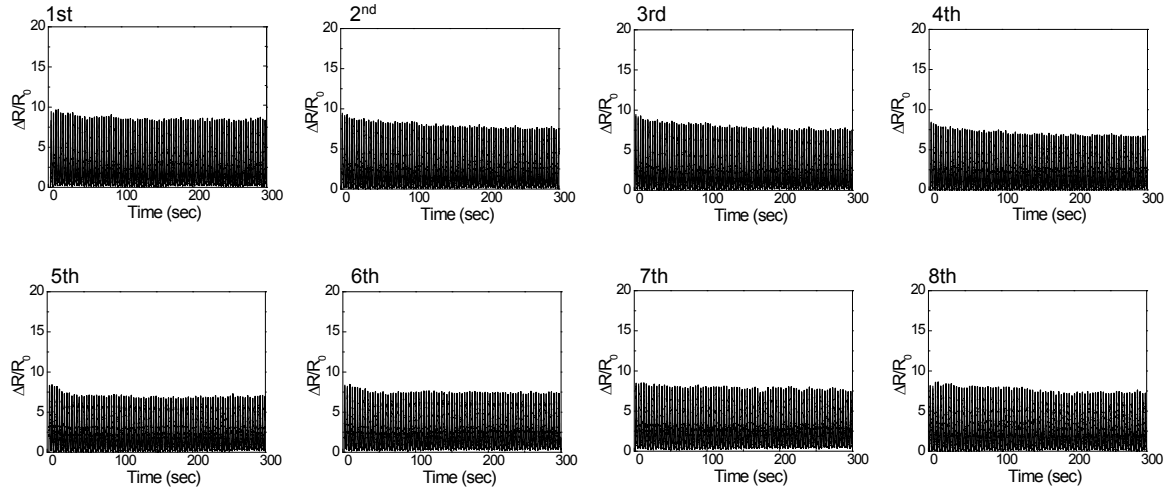

Figure S11. Resistance signal data in 664-times repeated measurement at a pressure of 30 kPa for the 3D-printed array device.

Movie S1. Motion picture of showing the 3D-printing process of Ag electrodes on the pre-structured PDMS substrate (recording speed: x2.5).

Movie S2. Motion picture of showing the printing process of SIS insulator parts on top of pre-printed Ag electrode lines (recording speed: x1.5).

Movie S3. Motion picture of showing the 3D-printing process of Ag electrodes on top of pre-stacked Ag electrode lines and SIS insulator parts (recording speed: x1.5).

Movie S4. Motion picture of showing the 3D-printing process of sensor layers in the array device (recording speed: x1.5). The as-printed suspending lines became flat by a solvent evaporation, prior to the next pillar printing process.