A fully screen-printed flexible sensor array based on piezoelectric polymer P(VDF-TrFE) poly(vinylidene fluoride trifluor-oethylene) sensors were fabricated by JOANNEUM RESEARCH [1]. The fabrication process is composed of first screen printing a bottom electrode on a flexible PCB (100 µm thick), then a ferroelectric polymer P(VDF-TrFE) layer (5.1 µm thick) is then printed onto the bottom electrodes, followed by the top electrodes (PEDOT: PSS). A UV-curable lacquer layer is then deposited on top for overall sensor protection. Finally, the poling procedure aligns with the thickness direction of randomly oriented dipoles in P(VDF-TrFE) crystallites. The sensor array was encapsulated with polymeric skin-like compliant material (Dragon Skin, Smooth-On, USA), which provides the sensor with skin-like compliance. In particular, the sensing array is integrated between two silicon caps, and an FPC cable is used to extend the sensor tracks. To acquire sensor response, the embedded electronics presented in [2] are utilized in this study. It is based on a 64-channel analog-to-digital converter (DDC232) and a low-power ARM cortex-M0 microcontroller. In this study, the EE is configured to acquire the tactile signal from the 8 sensors at a sampling rate of 2 kSample\s. The sensing cap is connected to the EE through a flat cable, which was then connected to a host PC.

References

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