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Fabrication processes and problems of microelectromechanical system device based on PZT films

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Microelectromechanical system(MEMS) processes based on surface micromachining technique could be used to fabricate the electrical devices on silicon substrate such as cantilever beam and uncooled IR-detector using PZT thin films. Some problems during the fabricating processes made the device's failure. In this present, the examples of MEMS devices fabrication and its problems will be reported. A possible simple model for decrease of polarization after etching processes will be suggested. Currently, the saturation polarization of PZT at 15V without etching and with etching are around 40 $\mu\text{C}/\text{cm}^2$ and 25 $\mu\text{C}/\text{cm}^2$, respectively. In addition, piezoelectric coefficient at 4V measured by single beam laser interferometer, d_{33} of the PZT film will be showed according to the different bottom electrode. These results suggest that the PZT without short problem and with good interfacial structure are good for MEMS based on surface micromachining technique.