

## Pyroelectric response hysteresis loops of PZT films on Si substrate

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### Abstract

Recently the field of potential application of PZT compounds as film structures has been extended on nonlinear optics, SAW-devices, DRA and NVRA memories, FEFET and IR sensorics. At present PZT film based structures are considered among the best ones for creating suitable sensitive elements of Si-integrated pyroelectric detectors of radiation. It is connected both with variety of new methods of manufacturing effective pyroactive PZT-films on electroded silicone substrate and easiness of further matching the structures with silicone FET. Investigated Pt-PZT-Pt/Ti-SiO<sub>2</sub>/Si structures with oriented PZT layer were manufactured by RF magnetron sputtering. The pyroelectric and ferroelectric investigations were performed using the measuring set for complete pyroelectric and ferroelectric characterization. The amplitude-frequency and phase-frequency dependences of pyroelectric response in the current and voltage modes at different polarity of poling voltage were obtained. The data on investigations of pyroelectric current and voltage response external voltage loops together with ferroelectric hysteresis charge and current loops are presented and discussed. The comparative examination of loops of ferroelectric hysteresis, i. e. charges and currents of polarization reversal and loops of pyroelectric response hysteresis demonstrates that for pyroelectric converters the analysis of the pyroelectric response hysteresis loops completes the analysis of the ferroelectric hysteresis loops. This analysis gives the information about electric field induced changes of pyroelectric figures of merit. It is noted the possibility of effective voltage controlling of polar state of PZT/Si systems for creating pyroelectric converters with external voltage controlled sensitivity.