

3.10 Measurement of Ferroelectric Hysteresis Curves with a Novel Technique

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Electrical properties of ferroelectric capacitor structures are typically determined by making electrical measurements using characterization circuits, such as the Sawyer-Tower test circuit, which contains the capacitor as a circuit element. Unfortunately, the quantitative determination of basic ferroelectric capacitor device properties from typical measurement circuits is very difficult when the capacitor is not ideal, and in the case of the Sawyer-Tower test circuit many modifications have been proposed.

We developed a novel method for measuring the ferroelectric hysteresis loop by measuring the different in- and out-of-phase harmonics. With this technique we characterized TGS bulk crystals and thin films of KNTN and LiTaO₃. By comparison with the theoretical amplitudes of the harmonics the influence of parasitic conductivity and dielectric capacity could be eliminated.